DeCelle-Burke-Sala & Associates, Inc.

ENGINEERING REPORT

Definitive Subdivision
Clifton Court Development
217 Mill Street
Randolph, MA 02368

CLIENT:
217 Mill St, LLC
228 Park Avenue S, PMB35567
New York, NY 10003

PREPARED BY:
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Section 1.0 Existing Conditions

1.1 Site Location

The subject property is located at 217 Mill Street in the Town of Randolph. The Town of Randolph Assessor's office currently identifies the as Assessors ID 51-H-8.01 with a total area of approximately 77,512± square feet (SF). The property is located within the Residential Single Family High Density (RSFHD) zoning district.

Figure 1 - Aerial Map (MassGIS)

1.2 Existing Site Conditions

The site is bounded by Mill Street to the northeast, and is abutted by single-family residential properties to the east, south, and west. The dead end of Prospect Avenue is close to the locus, however, the property does not have any frontage on Prospect Avenue. The lot contains a 675± S.F. residential single-family dwelling that was constructed around 1950 per the Town's online property record database. In addition to the dwelling, there are two sheds located on the property. Vehicular access to the site is provided off Mill Street by a single-lane asphalt driveway to the west of the dwelling. The dwelling improvements include a deck on the westerly side of the building adjacent to the driveway, a concrete patio in the backyard and a concrete walkway along the front of the house. The vegetation in the northerly portion of the lot closest to Mill Street is predominately lawn, with several hedges and trees. The majority of the lot is covered by trees and considered wooded. A vinyl and chain-link fence traverse the rear of the property near the abutters

located on Hart Circle. Topography on the site varies throughout the property. Elevations along the frontage of the property on Mill Street range from approximately elevation 126 in the northeasterly corner, to elevation 132 in the northerly corner. Topography slopes up roughly 27% from the northeasterly corner at elevation 126 up to the house at elevation 136. The driveway slopes approximately 13% up from Mill Street to the peak of the driveway. The high elevation on-site is located towards the center of the property within the woods. From the high point, the topography generally slopes down to the abutters to the east down to a low elevation of approximately 122. All elevations refer to the North American Vertical Datum of 1988 (NAVD 88).

The existing building is serviced by sewer, domestic water and gas services, which connect to the respective mains in Mill Street. Overhead wires connect from the dwelling to the existing overhead wires in Mill Street to provide power and communication services to the existing dwelling. A roof gutter system on the existing dwelling captures the majority of roof runoff and downspouts direct the water to flow overland. No other stormwater controls are located on-site, as flows from the asphalt driveway are not collected and runoff to Mill Street. The site is not located within a Special Flood Hazard Zone as delineated on FIRM 25021C0217E, effective 07/17/2012. There do not appear to be any jurisdictional wetlands within 100-feet of the project locus.

1.3 Existing Soil Conditions

The on-site soils were identified using the USDA Natural Resources Conservation Services (NRCS) Soil Survey.

Figure 2 - Soil's Map

The site and surrounding soil types have been identified along with the corresponding Hydrologic Soil Groups (HSG) to include:

- 245B – Hinckley loamy sand, 3 to 8 percent slopes – HSG A
- 255B – Windsor loamy sand, 3 to 8 percent slopes – HSG A

The Natural Resources Conservation Service (NRCS) has mapped the local soils as predominately 245B Hinckley loamy sand 3-8% slopes, with a small portion of the lot adjacent to Mill Street as 255B Windsor loam sand 3-8% slopes. Four (4) test pits were performed on site in February, 2023. Each test pit contained sandy loam subsoils over top a coarse gravelly sand. Groundwater was observed in one of the four test pits. A rawls rate of 8.27 in/hr has been used due to a coarse gravelly sand being found in the location of each of the infiltration systems.

Section 2.0 Proposed Conditions

2.1 Proposed Site Conditions

The proposed project is a subdivision, which will include the construction of four (4) new single-family houses and a proposed roadway. Access to the subdivision will be provided off Mill Street by a 40-ft. wide private way, which ends at a cul-de-sac with a 42-ft. pavement radius. The proposed street layout will have 24-ft. of pavement with vertical granite curbing on both sides. Each proposed single-family house will be provided vehicular access to the proposed road by a curb cut and asphalt driveway.

The street will be graded to have a 2.9% grade for the first approximately 19-ft. before transition to a 100-ft. Type IV Sag Vertical Curve. The roadway will have a slope of approximately 7% for approximately 10-ft. before transitioning to a 150-ft. Type I Crest Vertical Curve. The highpoint of the roadway will be located towards the front of the cul-de-sac and will slope down toward the end of the road. A retaining wall is proposed along the easterly side of the roadway from approximately station 0+55 to approximately station 1+75. The retaining wall is approximately 5-ft. tall at its highest point.

The proposed subdivision will be improved by public utilities for the use of the four (4) proposed dwellings. A proposed 8-in. PVC gravity sewer main is proposed to be installed for the length of the roadway. The proposed sewer main will tie into the existing 8-in. PVC sewer main in Mill Street by constructing a doghouse manhole in Mill Street. A sewer manhole is proposed at the end of the proposed sewer main in the cul-de-sac of the proposed roadway. Each house will tie into the proposed sewer main by gravity with proposed 4-in. PVC sewer services. An 8-in. CLDI (cement-lined ductile iron) water main will be installed for the length of the roadway. The proposed water main will tie into the existing water main in Mill Street. Each house will be provided water service by a 1-in. “type K” copper pipe. A fire hydrant is proposed at the end of the proposed 8-in. water main and will be located within the cul-de-sac of the proposed roadway. A proposed gas main shall be installed by the local utility purveyor’s standards to provide gas service to each dwelling. Power and communication services will be provided by underground wires. A transformer will be installed within the subdivision.

2.2 Proposed Stormwater

Proposed stormwater controls shall comply with local, state and federal regulations. Stormwater generated by the proposed street will be collected, treated, and infiltrated to protect the down gradient abutting properties. The proposed stormwater management systems is comprised of a total of five (5) deep sump catch basins, two (2) proprietary water quality units, three (3) subsurface

infiltration systems constructed of precast concrete leaching galleys and two surface infiltration basins. The majority of the stormwater runoff on site is produced by the asphalt roadway and proposed buildings.

Subsurface Infiltration System 1 consists of nine (9) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 1 collects the majority of the roadway by two deep sump catch basins located near the intersection of the proposed roadway and Mill Street. The catch basins convey the stormwater runoff to a proprietary water quality unit which pretreats the runoff prior to it being released to the subsurface infiltration system. System 1 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of a larger storm event the stormwater runoff will by-pass the proposed catch basins and be collected by the existing drainage system in Mill Street. Subsurface System 2 is centrally located on the site and collects the stormwater runoff from the remainder of the twenty four (24) foot wide roadway. Stormwater runoff is captured by two (2) deep sump catch basins and conveyed to a proprietary water quality unit for pretreatment before it is release to Subsurface System 2. System 2 consists of twelve (12) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 2 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of larger storm events, System 2 has been fitted with a 12 inch outlet pipe which extends to Surface Basin 2 where it is released onto a riprap outlet protection apron. Subsurface system 3 collects the entirety of the cul-de-sac through a single deep sump catch basin. The deep sump catch basin conveys the stormwater runoff to a proprietary water quality unit for pretreatment before it is released to Subsurface System 3. System 3 consists of forty eight (48) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 2 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of larger storm events, System 2 has been fitted with a 12 inch outlet pipe which extends to Surface Basin 1 where it is released onto a riprap outlet protection apron.

Surface Basin 1 is a 2,456± S.F. surface infiltration basin which contains and infiltrates stormwater runoff from overland flow, the proposed roofs and overflow from Subsurface System 3. Basin 1 has been designed to infiltrate the entirety of the 2-, 10-, and 25-year storm events with allowing a minor amount of sheet flow released for the 100-year storm event. Surface Basin 2 is a 1,435± S.F. surface infiltration basin which detains and infiltrates stormwater runoff from overland flow, the proposed roofs and overflow from Subsurface System 2. Basin 2 has been designed to infiltrate the entirety of the 2-, 10-, and 25-year storm events with allowing a minor amount of sheet flow released for the 100-year storm event. The basins shall be grassed with an emergency riprap outlet weir as an overflow.

Section 3.0 Stormwater Management

3.1 MassDEP Stormwater Performance Standards

It is the intent of this report to show compliance with the Massachusetts Stormwater Management Standards (the "Standards"). This office generated hydrographs for both existing and proposed conditions to compare overall storm water offsite for various storms. We calculated land coverage numbers (CN) using Hydrologic Group "A" soils and used minimums for Times of Concentration for proposed conditions for hydrograph generation. A Rawl's Rate of 2.41 in./hr. was used for exfiltration. Through the use of stormwater control BMP's, proposed peak stormwater discharge rates decrease in comparison to the peak existing discharge rates.

Stormwater Best Management Practices have been incorporated into the design of the project to mitigate the anticipated pollutant loading. An Operations and Maintenance Plan has been developed for the project, which addresses the long-term maintenance requirements of the proposed system.

Temporary erosion and sedimentation controls will be incorporated into the construction phase of the project. These temporary controls may include straw wattles and/or silt fence barriers, inlet sediment traps, slope stabilization, and stabilized construction entrances.

The Massachusetts Department of Environmental Protection has established ten (10) Stormwater Management Standards. A project that meets or exceeds the standards is presumed to satisfy the regulatory requirements regarding stormwater management. The Standards are enumerated below as well as descriptions and supporting calculations as to how the Project will comply with the Standards:

Standard 1

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

All stormwater runoff with the potential for collecting suspended solids and pollutants is treated through the use of stormwater infiltration structures prior to its discharge to the surrounding environment.

Standard 2

Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Post-development discharge rates do not exceed pre-development through the use of underground and surface infiltration. The proposed site has been graded to capture the majority of the stormwater runoff so that it can be treated and released to best match the existing site hydraulics. The design points analyzed when comparing the pre- and post-development peak discharge rates are the flows to Mill Street, flows to the northeasterly abutters and flows to the easterly abutter. Through grading and stormwater BMP's, this

office was able to reduce the pre-development peak discharge rates to all three design points. A comparison chart for the pre- and post-development peak flows are included further in this report, and HydroCAD analyses included in Appendix A of this report.

Standard 3

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

The proposed site was designed to ensure that the annual recharge for the post-development site shall approximate or exceed the annual recharge from the pre-development conditions based on the soil type. Calculations showing that this development meets the criteria for Standard 3, which includes the required recharge volume and that the infiltration systems will drain fully within 72 hours have been included in Appendix D of this report.

Standard 4

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

- *Suitable practices for source control and pollution prevention are identified in a longterm pollution prevention plan, and thereafter are implemented and maintained;*
- *Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
- *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

This site meets all aspects of Standard 4 by utilizing proprietary stormwater structures for TSS removal, sizing the infiltration system adequately to handle the required water quality volume, and providing a long-term pollution prevention plan.

Standard 5

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

This project is not classified as a land with higher potential pollutant loads.

Standard 6

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

This project is not located within a Zone II, IWPA, or any other critical area.

Standard 7

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

This project does not qualify as a redevelopment project due to the proposed increase in impervious area.

Standard 8

A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

A plan to control construction related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities has been included in Appendix C.

Standard 9

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

A long term operation and maintenance plan has been developed for this property to ensure the stormwater management systems function as designed and is included in Appendix B.

Standard 10

All illicit discharges to the stormwater management system are prohibited.

No illicit discharges will be allowed to the proposed stormwater management system and a signed illicit discharge statement has been included in the Operation and Maintenance Plan.

Stormwater Runoff Comparison Chart for Pre- and Post-Construction Flows to Mill Street

2 Year Storm (3.40")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.05	Flow off-site	0.00

10 Year Storm (5.20")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.30	Flow off-site	0.00

25 Year Storm (6.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.50	Flow off-site	0.20

100 Year Storm (8.06")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.85	Flow off-site	0.63

Stormwater Runoff Comparison Chart for Pre- and Post-Construction Flows to Northeasterly Abutters

2 Year Storm (3.40")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.00	Flow off-site	0.00

10 Year Storm (5.20")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.00	Flow off-site	0.00

25 Year Storm (6.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.01	Flow off-site	0.00

100 Year Storm (8.06")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.04	Flow off-site	0.02

Stormwater Runoff Comparison Chart for Pre- and Post-Construction Flows to Easterly Abutters

2 Year Storm (3.40")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.00	Flow off-site	0.00

10 Year Storm (5.20")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.00	Flow off-site	0.00

25 Year Storm (6.33")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.02	Flow off-site	0.02

100 Year Storm (8.06")			
Existing Conditions		Proposed Conditions	
Area Description	Flow (CFS)	Area Description	Flow (CFS)
Flow off-site	0.13	Flow off-site	0.12

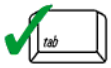
3.2 MassDEP Stormwater Checklist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

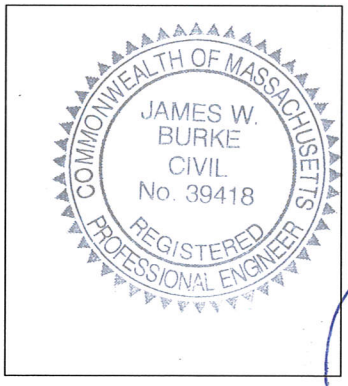
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



4/10/23

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): Stormwater Infiltration

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☒ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☒ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

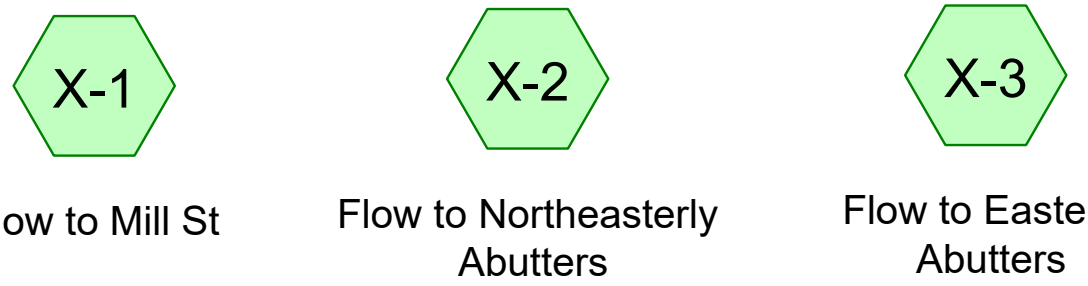
☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Appendix A HydroCAD Reports

Existing HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for 217 Mill St - Existing Drainage (rev 2-6-23)
Prepared by DeCelle-Burke-Sala & Associates, Inc., Printed 4/10/2023

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
9,090	39	>75% Grass cover, Good, HSG A (X-1, X-2, X-3)
3,190	98	Paved parking, HSG A (X-1)
919	98	Roofs, HSG A (X-1)
64,313	30	Woods, Good, HSG A (X-1, X-2, X-3)

Summary for Subcatchment X-1: Flow to Mill St

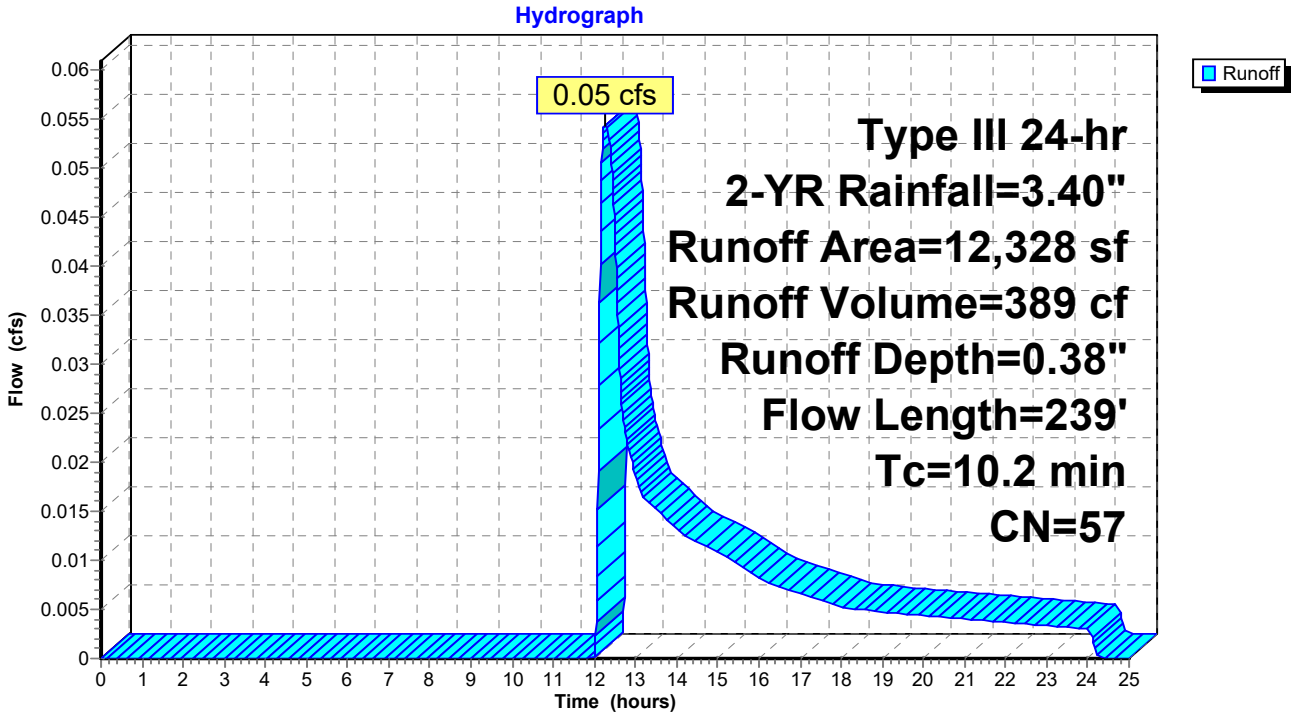
Runoff = 0.05 cfs @ 12.27 hrs, Volume= 389 cf, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
3,190	98	Paved parking, HSG A
919	98	Roofs, HSG A
5,640	39	>75% Grass cover, Good, HSG A
2,579	30	Woods, Good, HSG A
12,328	57	Weighted Average
8,219		66.67% Pervious Area
4,109		33.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0460	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.8	53	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	22	0.0040	1.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	114	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	239	Total			

Subcatchment X-1: Flow to Mill St



Summary for Subcatchment X-2: Flow to Northeasterly Abutters

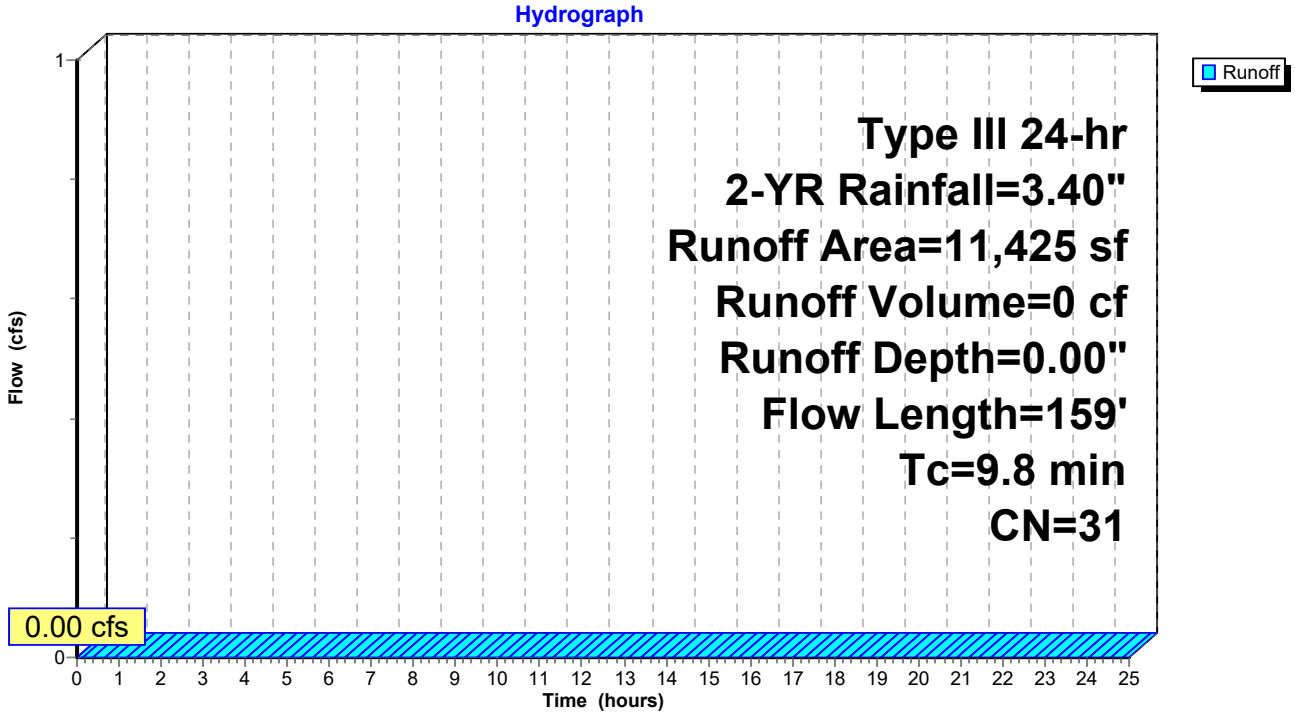
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,467	39	>75% Grass cover, Good, HSG A
9,958	30	Woods, Good, HSG A
11,425	31	Weighted Average
11,425		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0420	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.9	109	0.1670	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	159	Total			

Subcatchment X-2: Flow to Northeasterly Abutters



Summary for Subcatchment X-3: Flow to Easterly Abutters

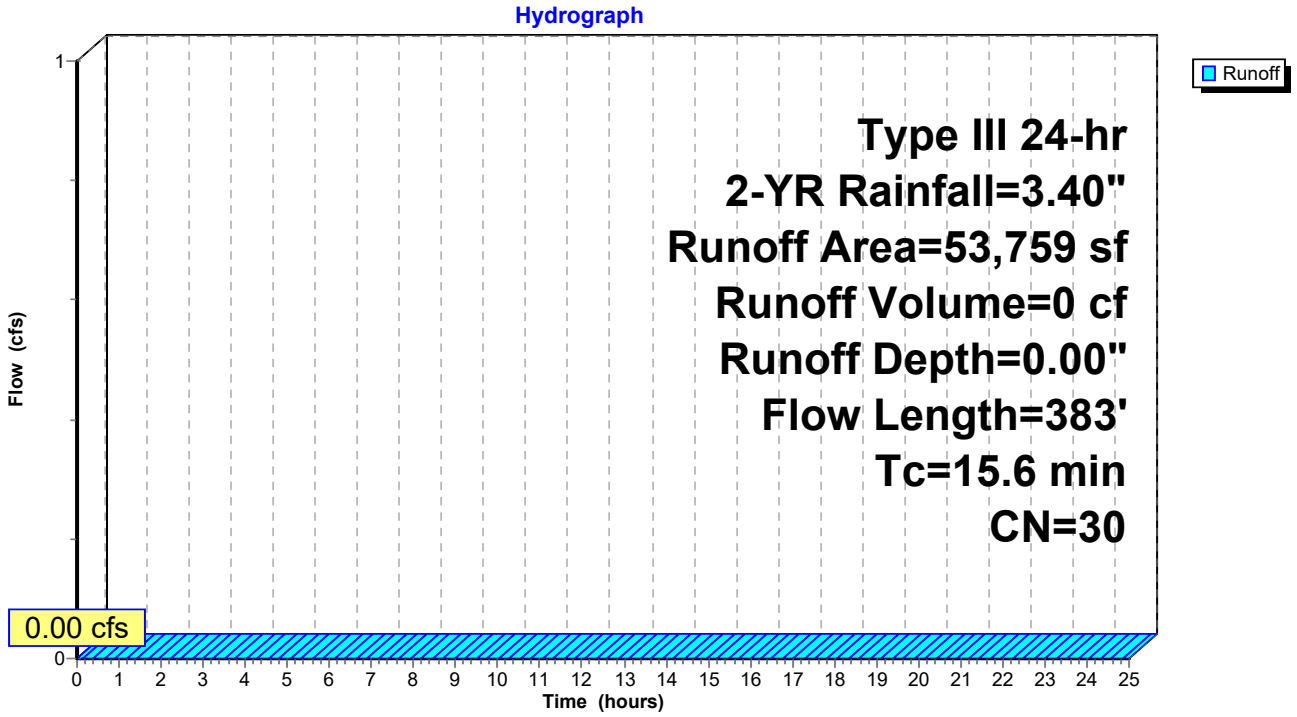
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,983	39	>75% Grass cover, Good, HSG A
51,776	30	Woods, Good, HSG A
53,759	30	Weighted Average
53,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0760	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.4	92	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	61	0.0030	0.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	78	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	102	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	383	Total			

Subcatchment X-3: Flow to Easterly Abutters



Summary for Subcatchment X-1: Flow to Mill St

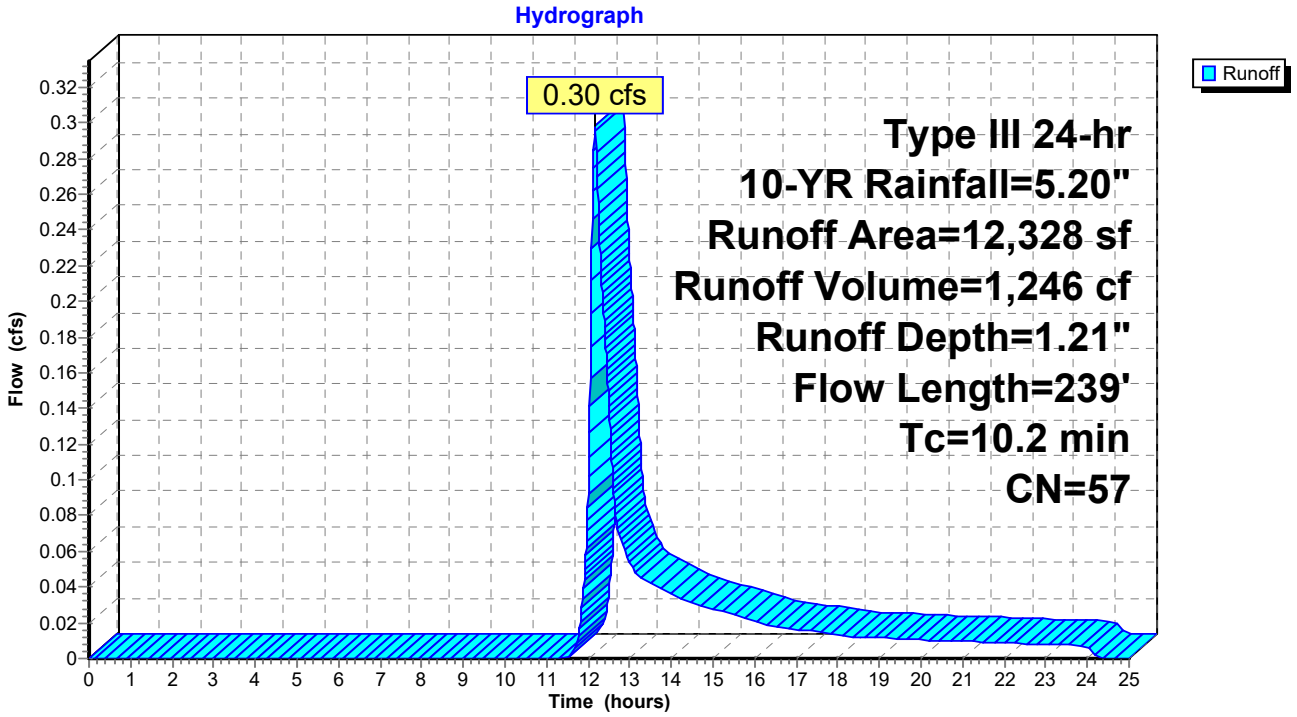
Runoff = 0.30 cfs @ 12.16 hrs, Volume= 1,246 cf, Depth= 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
3,190	98	Paved parking, HSG A
919	98	Roofs, HSG A
5,640	39	>75% Grass cover, Good, HSG A
2,579	30	Woods, Good, HSG A
12,328	57	Weighted Average
8,219		66.67% Pervious Area
4,109		33.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0460	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.8	53	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	22	0.0040	1.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	114	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	239	Total			

Subcatchment X-1: Flow to Mill St



Summary for Subcatchment X-2: Flow to Northeasterly Abutters

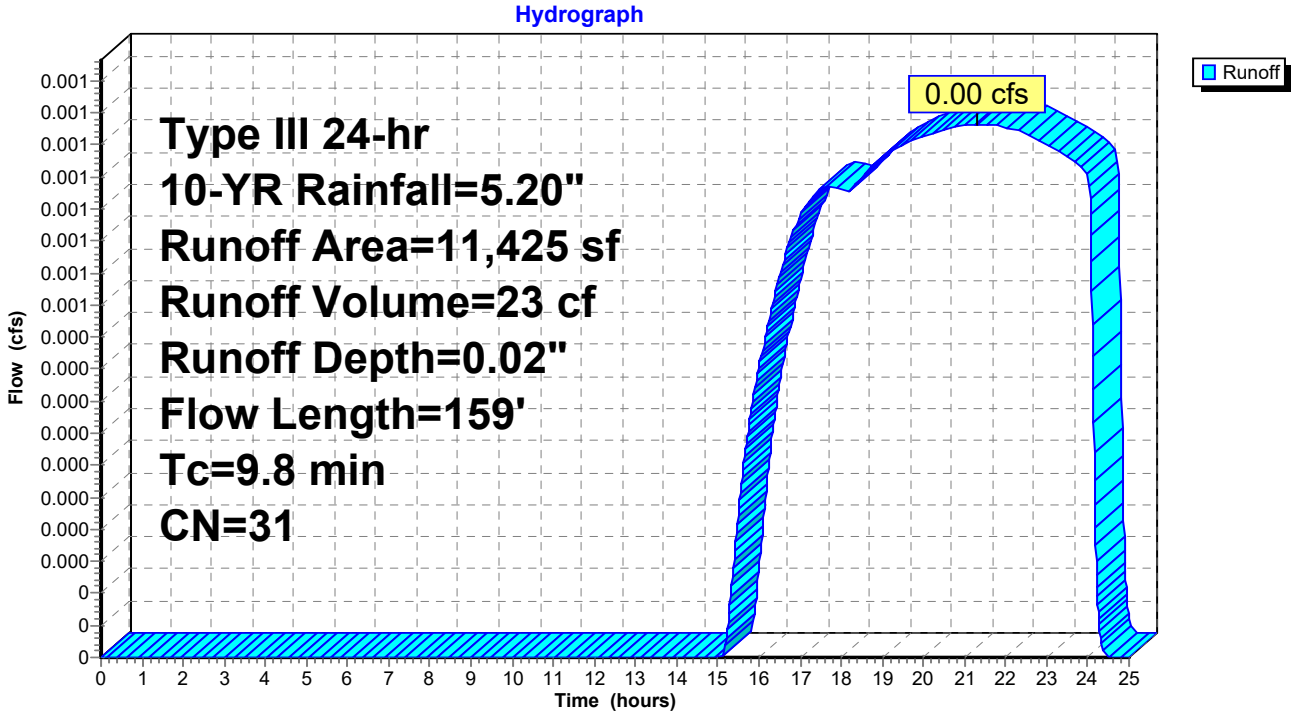
Runoff = 0.00 cfs @ 21.31 hrs, Volume= 23 cf, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,467	39	>75% Grass cover, Good, HSG A
9,958	30	Woods, Good, HSG A
11,425	31	Weighted Average
11,425		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0420	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.9	109	0.1670	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	159	Total			

Subcatchment X-2: Flow to Northeasterly Abutters



Summary for Subcatchment X-3: Flow to Easterly Abutters

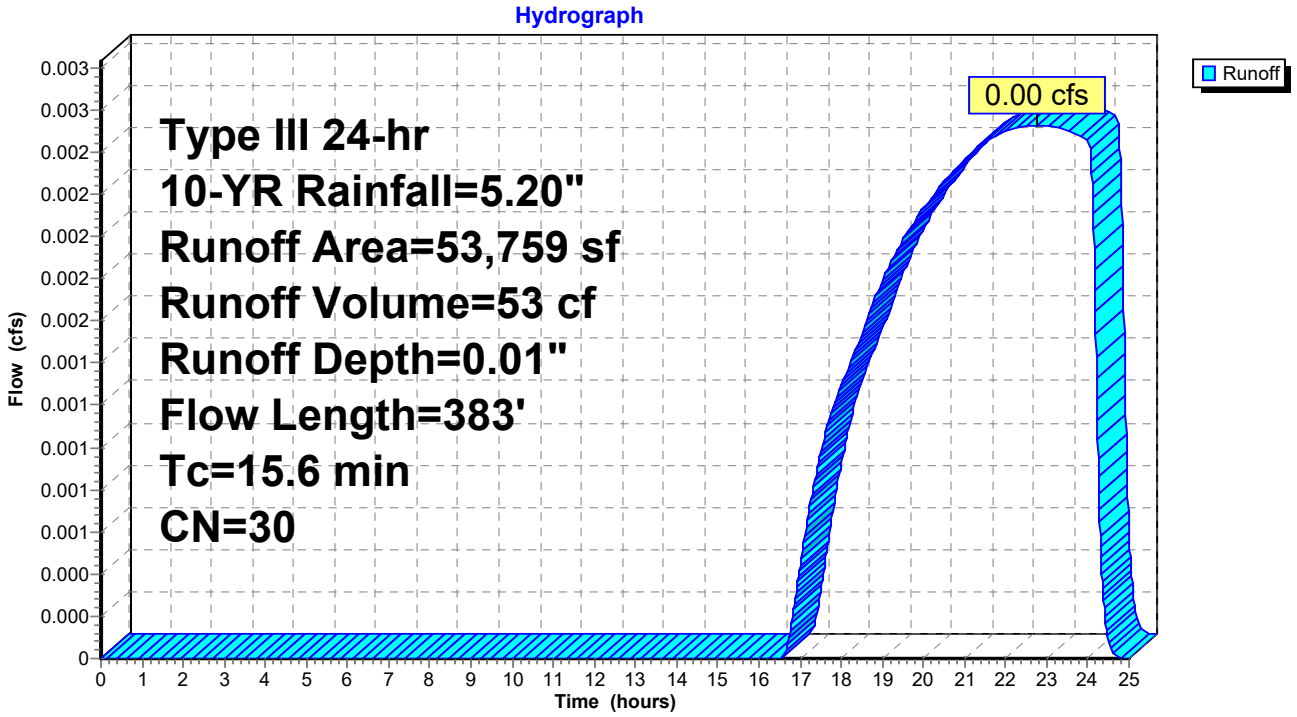
Runoff = 0.00 cfs @ 22.76 hrs, Volume= 53 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,983	39	>75% Grass cover, Good, HSG A
51,776	30	Woods, Good, HSG A
53,759	30	Weighted Average
53,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0760	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.4	92	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	61	0.0030	0.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	78	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	102	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	383	Total			

Subcatchment X-3: Flow to Easterly Abutters



Summary for Subcatchment X-1: Flow to Mill St

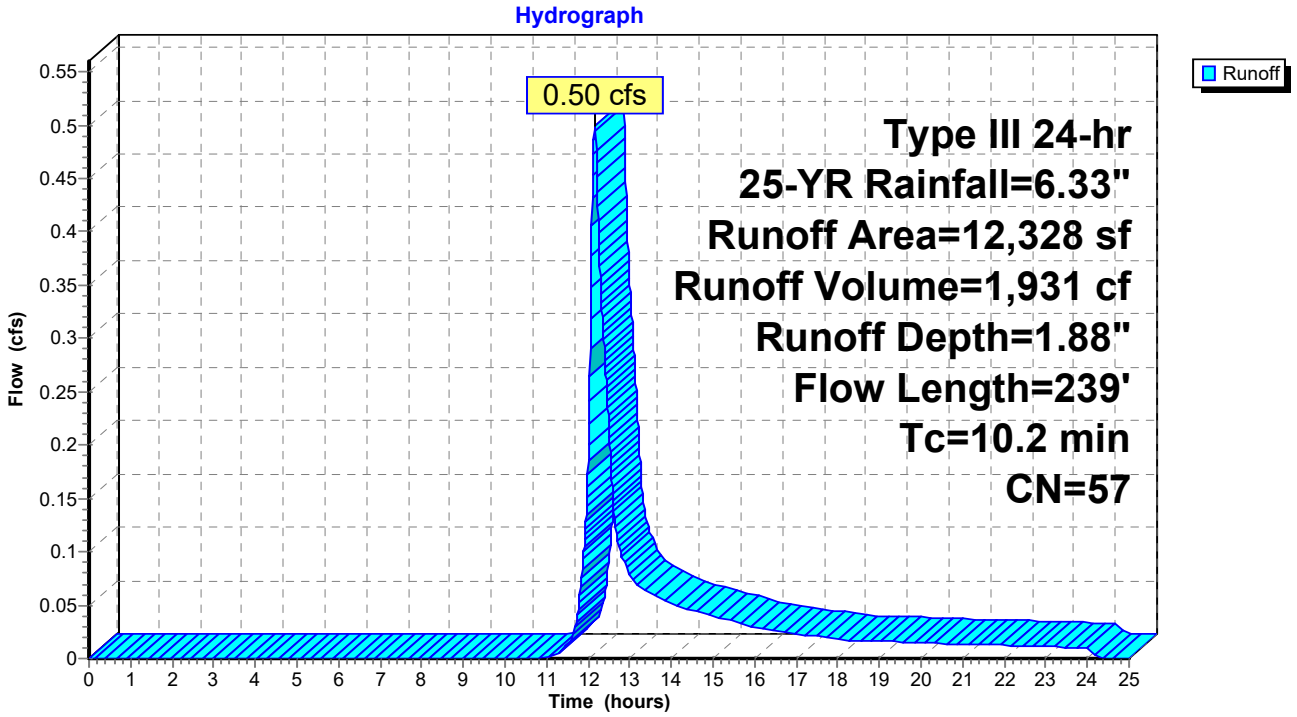
Runoff = 0.50 cfs @ 12.16 hrs, Volume= 1,931 cf, Depth= 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
3,190	98	Paved parking, HSG A
919	98	Roofs, HSG A
5,640	39	>75% Grass cover, Good, HSG A
2,579	30	Woods, Good, HSG A
12,328	57	Weighted Average
8,219		66.67% Pervious Area
4,109		33.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0460	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.8	53	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	22	0.0040	1.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	114	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	239	Total			

Subcatchment X-1: Flow to Mill St



Summary for Subcatchment X-2: Flow to Northeasterly Abutters

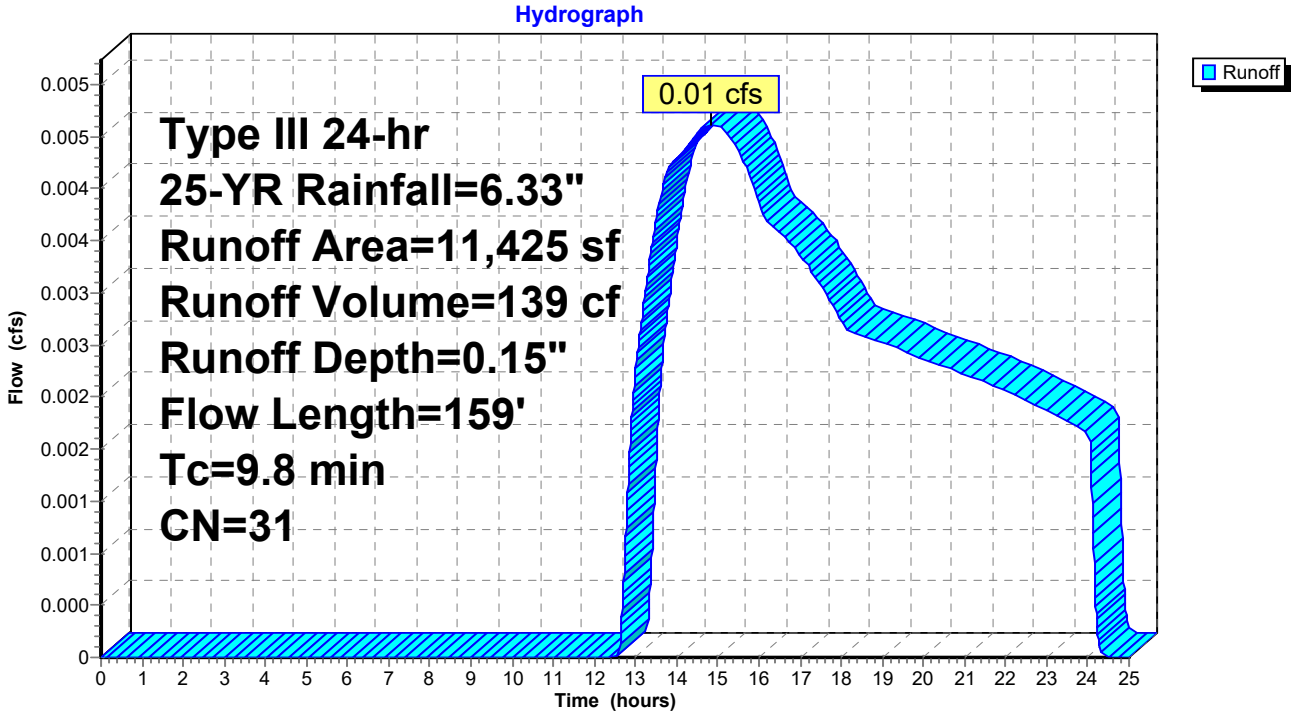
Runoff = 0.01 cfs @ 14.84 hrs, Volume= 139 cf, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,467	39	>75% Grass cover, Good, HSG A
9,958	30	Woods, Good, HSG A
11,425	31	Weighted Average
11,425		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0420	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.9	109	0.1670	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	159	Total			

Subcatchment X-2: Flow to Northeasterly Abutters



Summary for Subcatchment X-3: Flow to Easterly Abutters

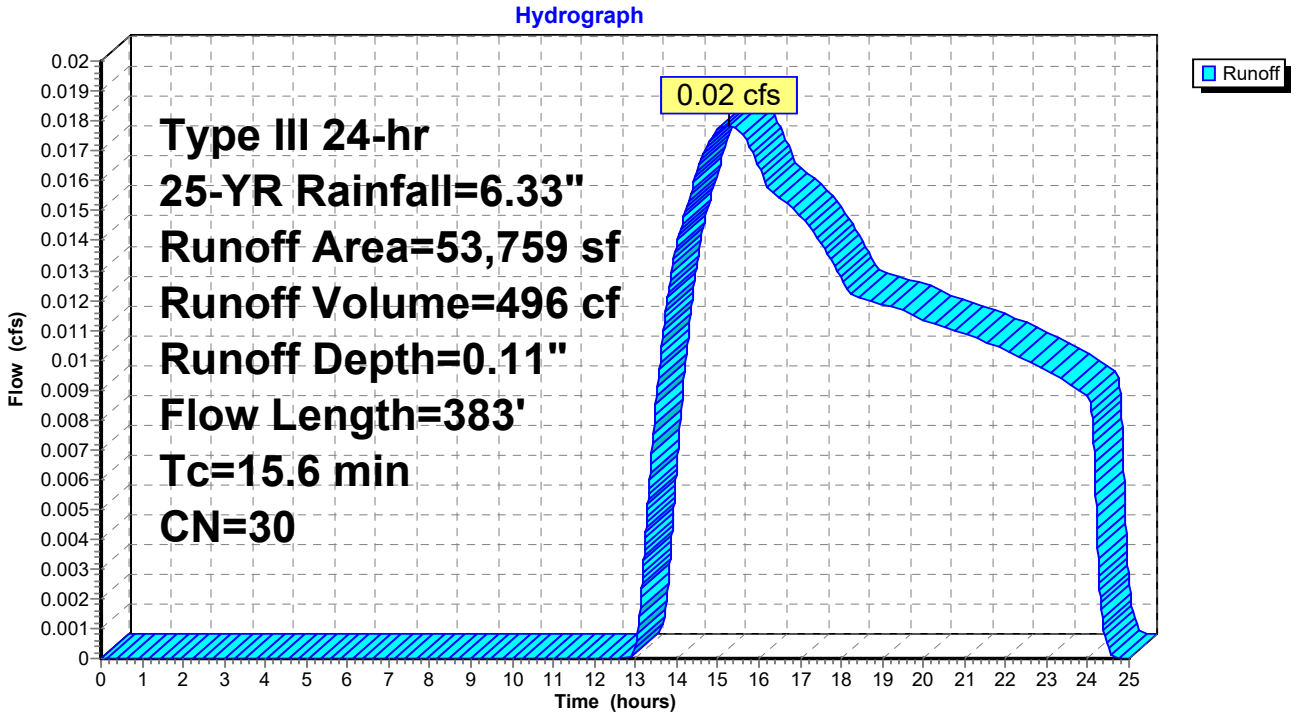
Runoff = 0.02 cfs @ 15.27 hrs, Volume= 496 cf, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,983	39	>75% Grass cover, Good, HSG A
51,776	30	Woods, Good, HSG A
53,759	30	Weighted Average
53,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0760	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.4	92	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	61	0.0030	0.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	78	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	102	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	383	Total			

Subcatchment X-3: Flow to Easterly Abutters



Summary for Subcatchment X-1: Flow to Mill St

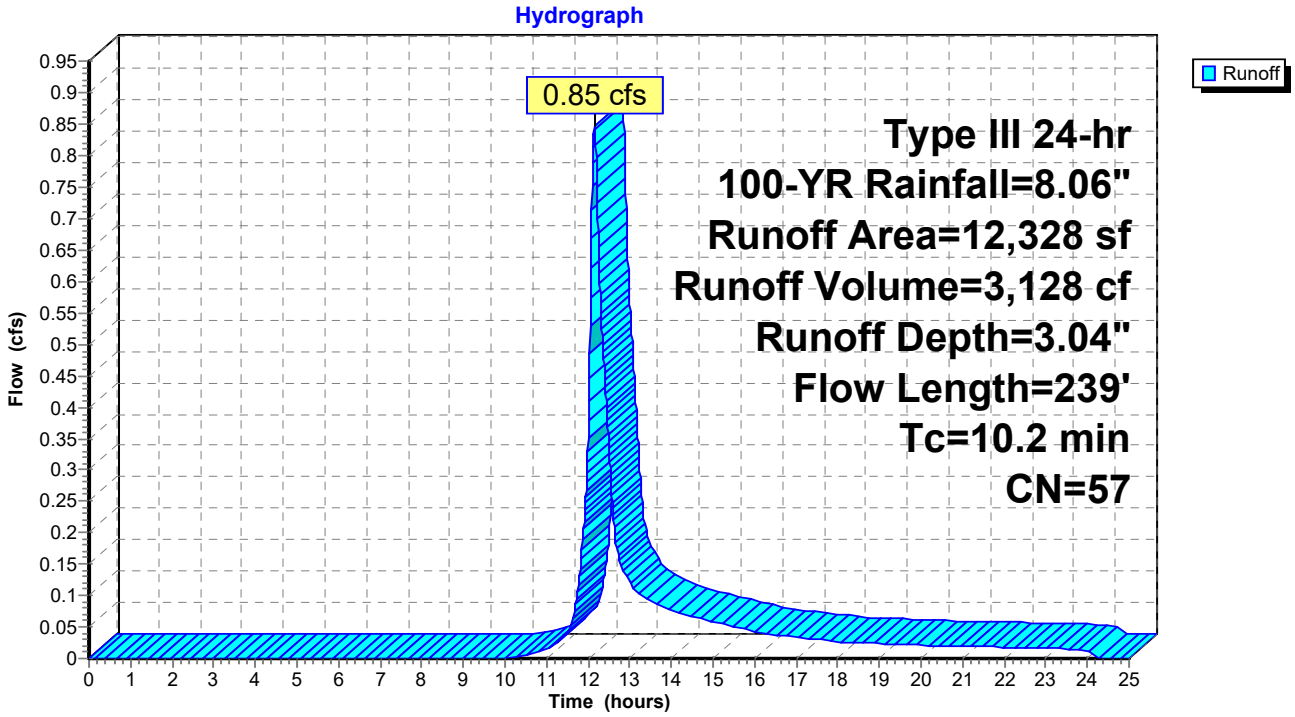
Runoff = 0.85 cfs @ 12.15 hrs, Volume= 3,128 cf, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
3,190	98	Paved parking, HSG A
919	98	Roofs, HSG A
5,640	39	>75% Grass cover, Good, HSG A
2,579	30	Woods, Good, HSG A
12,328	57	Weighted Average
8,219		66.67% Pervious Area
4,109		33.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0460	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.8	53	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	22	0.0040	1.02		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.4	114	0.0700	5.37		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.2	239	Total			

Subcatchment X-1: Flow to Mill St



Summary for Subcatchment X-2: Flow to Northeasterly Abutters

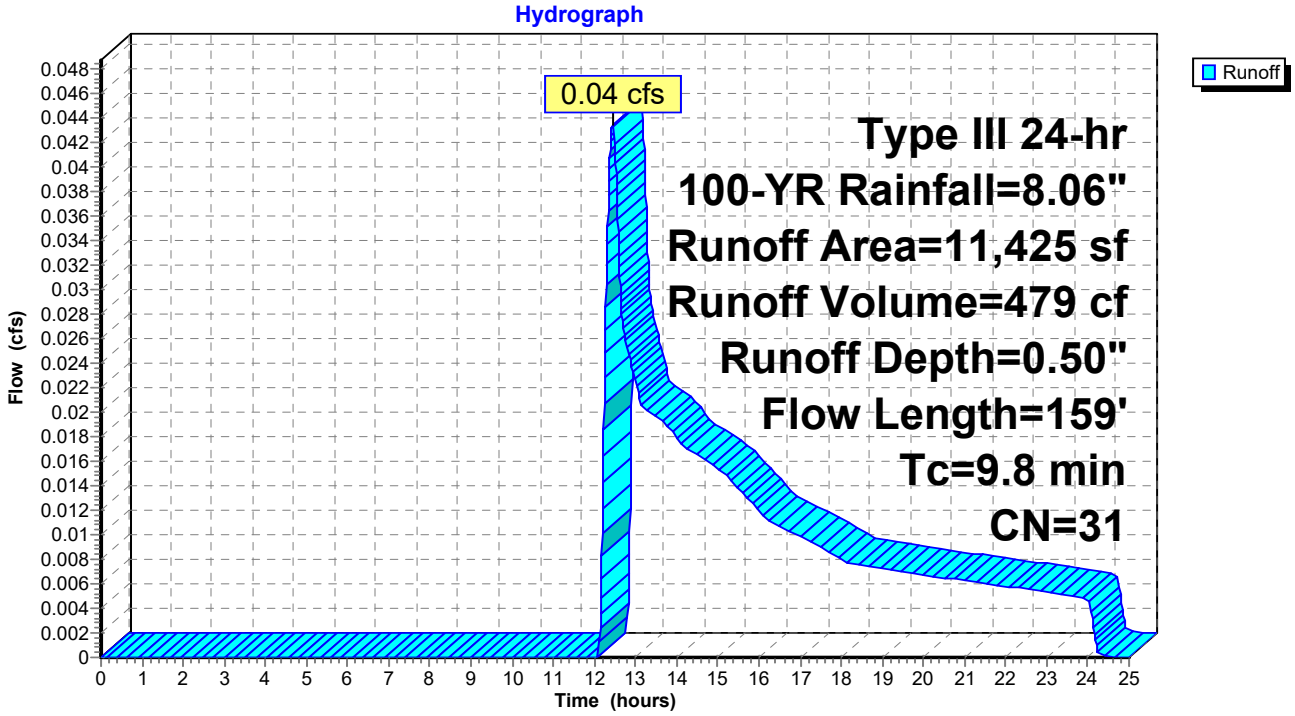
Runoff = 0.04 cfs @ 12.44 hrs, Volume= 479 cf, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,467	39	>75% Grass cover, Good, HSG A
9,958	30	Woods, Good, HSG A
11,425	31	Weighted Average
11,425		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0420	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
0.9	109	0.1670	2.04		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.8	159	Total			

Subcatchment X-2: Flow to Northeasterly Abutters



Summary for Subcatchment X-3: Flow to Easterly Abutters

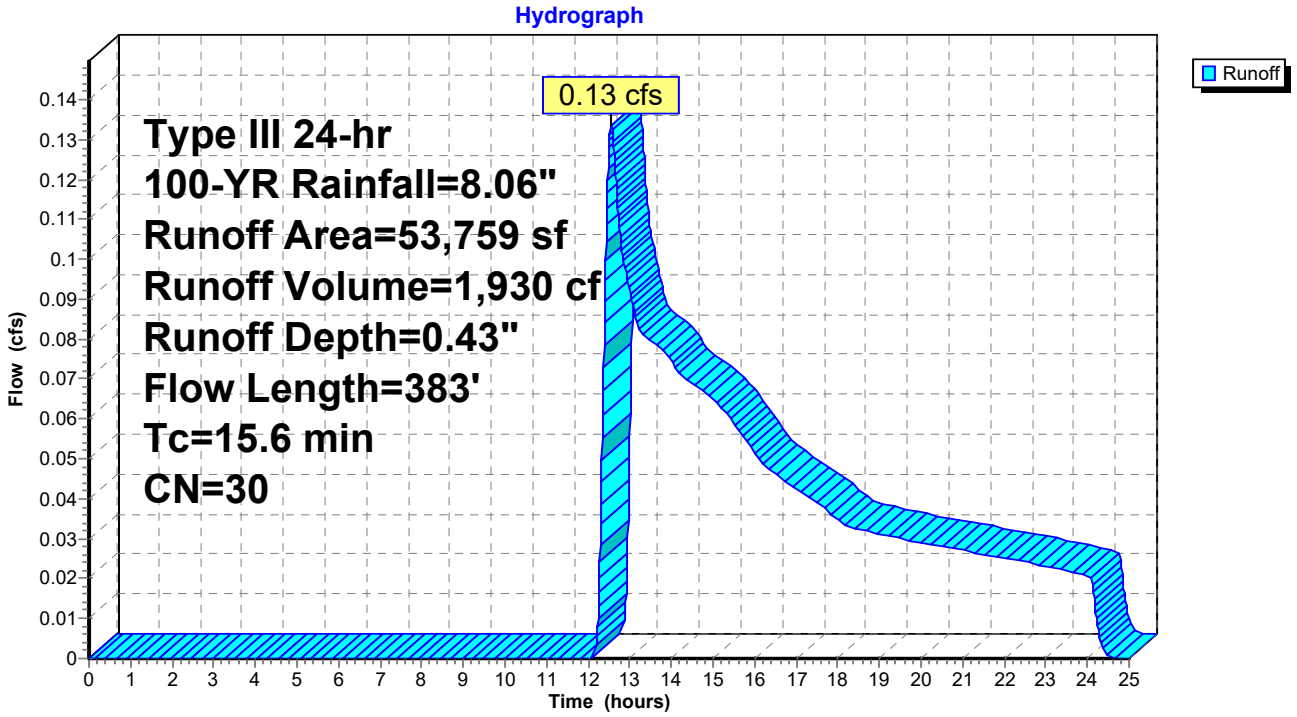
Runoff = 0.13 cfs @ 12.56 hrs, Volume= 1,930 cf, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

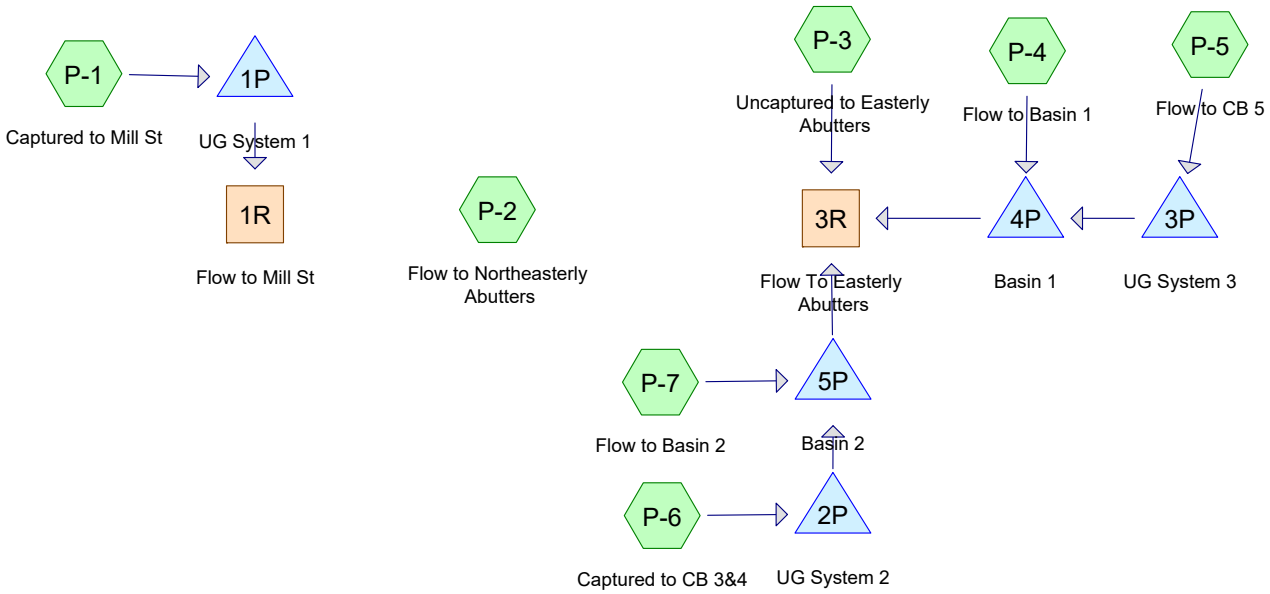
Area (sf)	CN	Description
0	98	Paved parking, HSG A
0	98	Roofs, HSG A
1,983	39	>75% Grass cover, Good, HSG A
51,776	30	Woods, Good, HSG A
53,759	30	Weighted Average
53,759		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0760	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
1.4	92	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	61	0.0030	0.27		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	78	0.0200	0.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	102	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.6	383	Total			

Subcatchment X-3: Flow to Easterly Abutters



Proposed HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for 217 Mill St - Proposed Drainage (rev 4-6-23)
Prepared by DeCelle-Burke-Sala & Associates, Inc., Printed 4/10/2023

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
47,887	39	>75% Grass cover, Good, HSG A (P-1, P-2, P-3, P-4, P-5, P-6, P-7)
19,668	98	Paved parking, HSG A (P-1, P-5, P-6)
7,520	98	Roofs, HSG A (P-4, P-7)
2,437	30	Woods, Good, HSG A (P-2, P-3, P-4)

Summary for Subcatchment P-1: Captured to Mill St

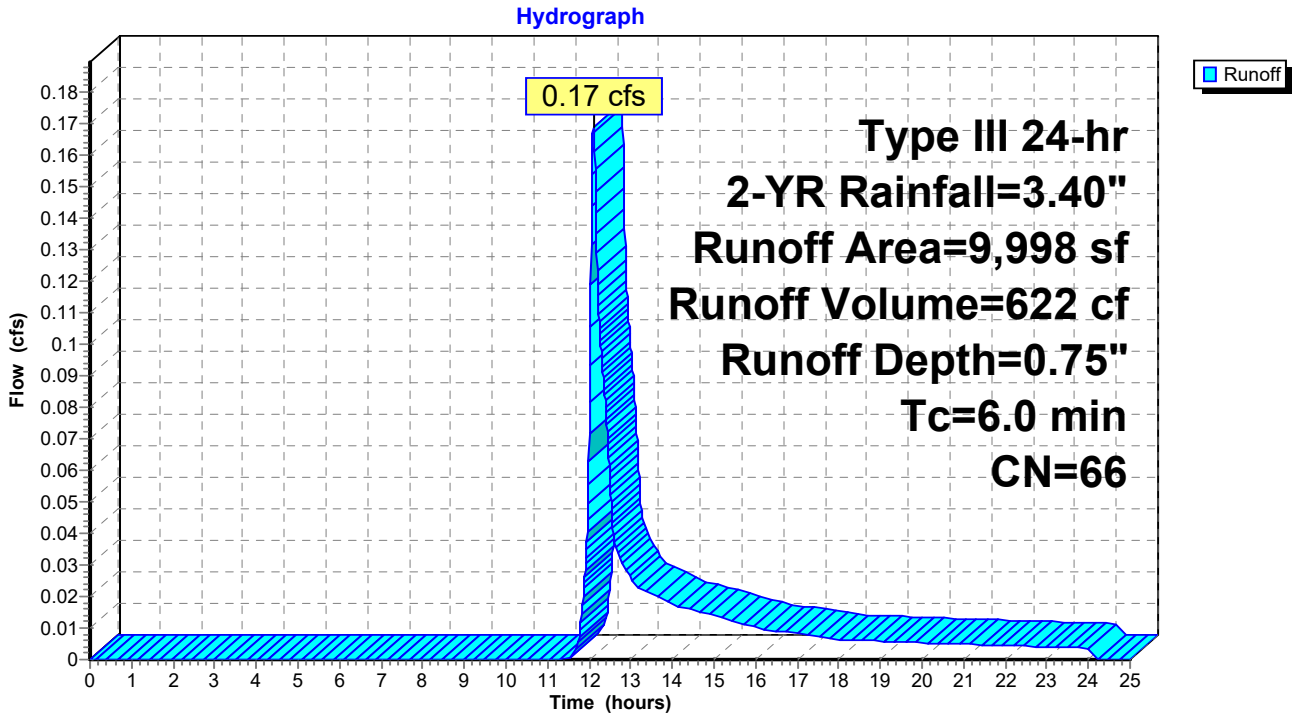
Runoff = 0.17 cfs @ 12.10 hrs, Volume= 622 cf, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
4,541	98	Paved parking, HSG A
5,457	39	>75% Grass cover, Good, HSG A
9,998	66	Weighted Average
5,457		54.58% Pervious Area
4,541		45.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-1: Captured to Mill St



Summary for Subcatchment P-2: Flow to Northeasterly Abutters

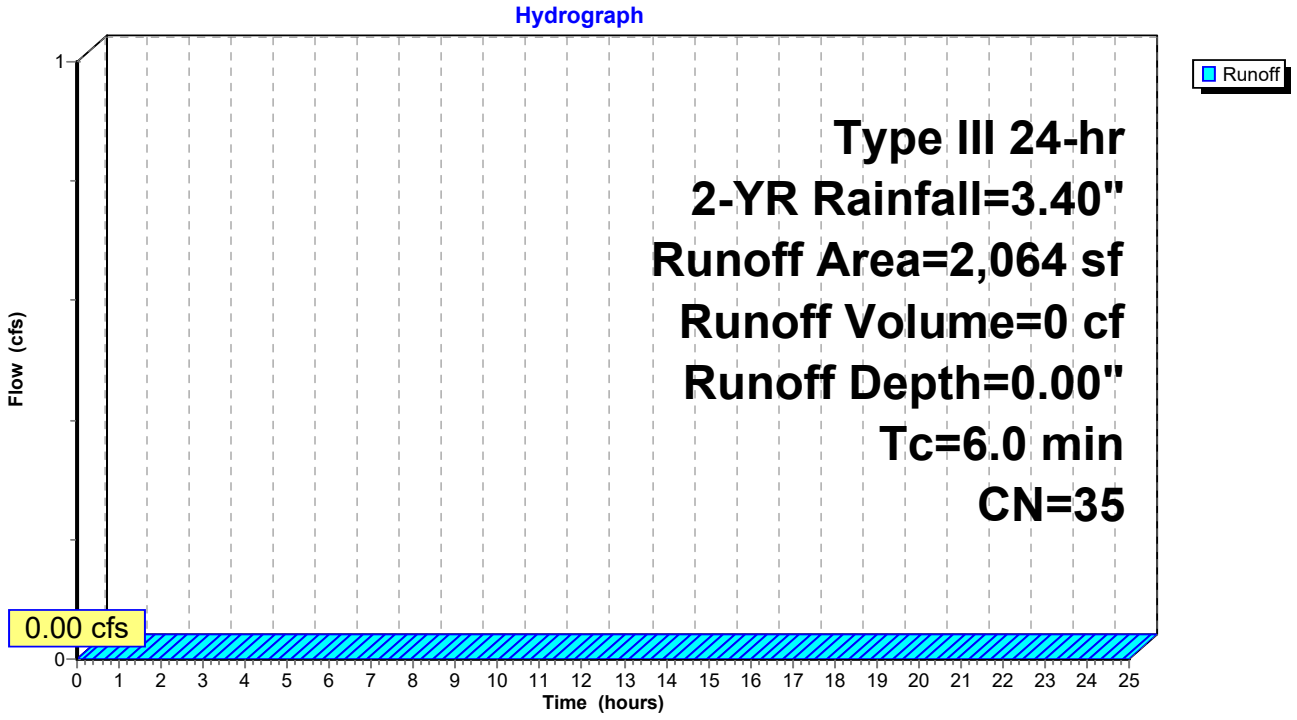
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,033	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
1,031	30	Woods, Good, HSG A
2,064	35	Weighted Average
2,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-2: Flow to Northeasterly Abutters



Summary for Subcatchment P-3: Uncaptured to Easterly Abutters

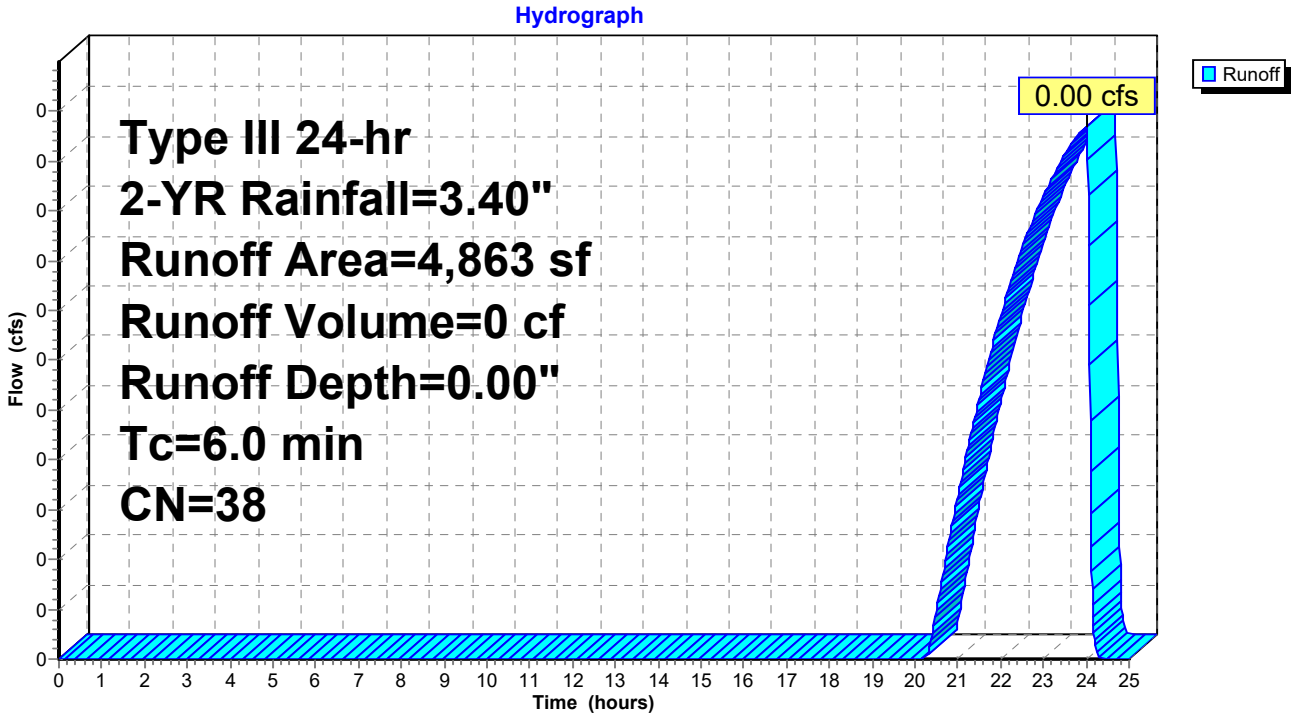
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
4,429	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
434	30	Woods, Good, HSG A
4,863	38	Weighted Average
4,863		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-3: Uncaptured to Easterly Abutters



Summary for Subcatchment P-4: Flow to Basin 1

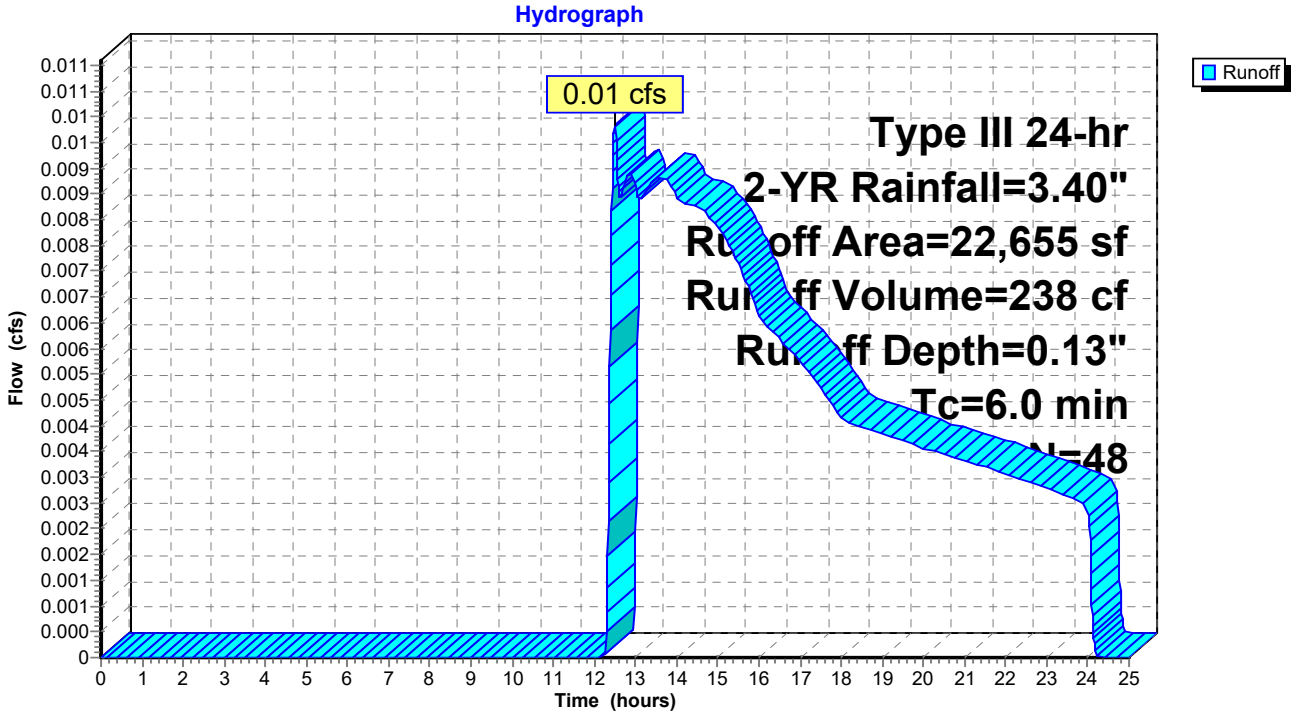
Runoff = 0.01 cfs @ 12.49 hrs, Volume= 238 cf, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
17,923	39	>75% Grass cover, Good, HSG A
0	98	Paved parking, HSG A
972	30	Woods, Good, HSG A
22,655	48	Weighted Average
18,895		83.40% Pervious Area
3,760		16.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-4: Flow to Basin 1



Summary for Subcatchment P-5: Flow to CB 5

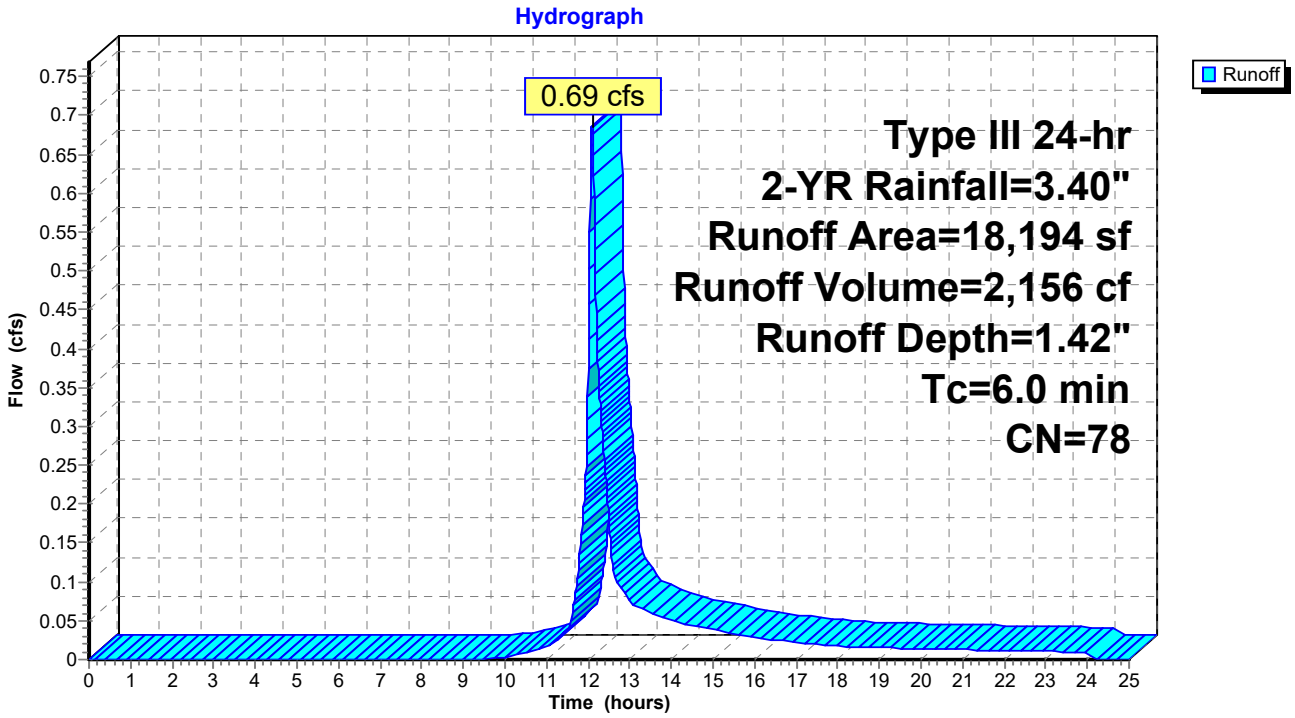
Runoff = 0.69 cfs @ 12.09 hrs, Volume= 2,156 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
11,917	98	Paved parking, HSG A
6,277	39	>75% Grass cover, Good, HSG A
18,194	78	Weighted Average
6,277		34.50% Pervious Area
11,917		65.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-5: Flow to CB 5



Summary for Subcatchment P-6: Captured to CB 3&4

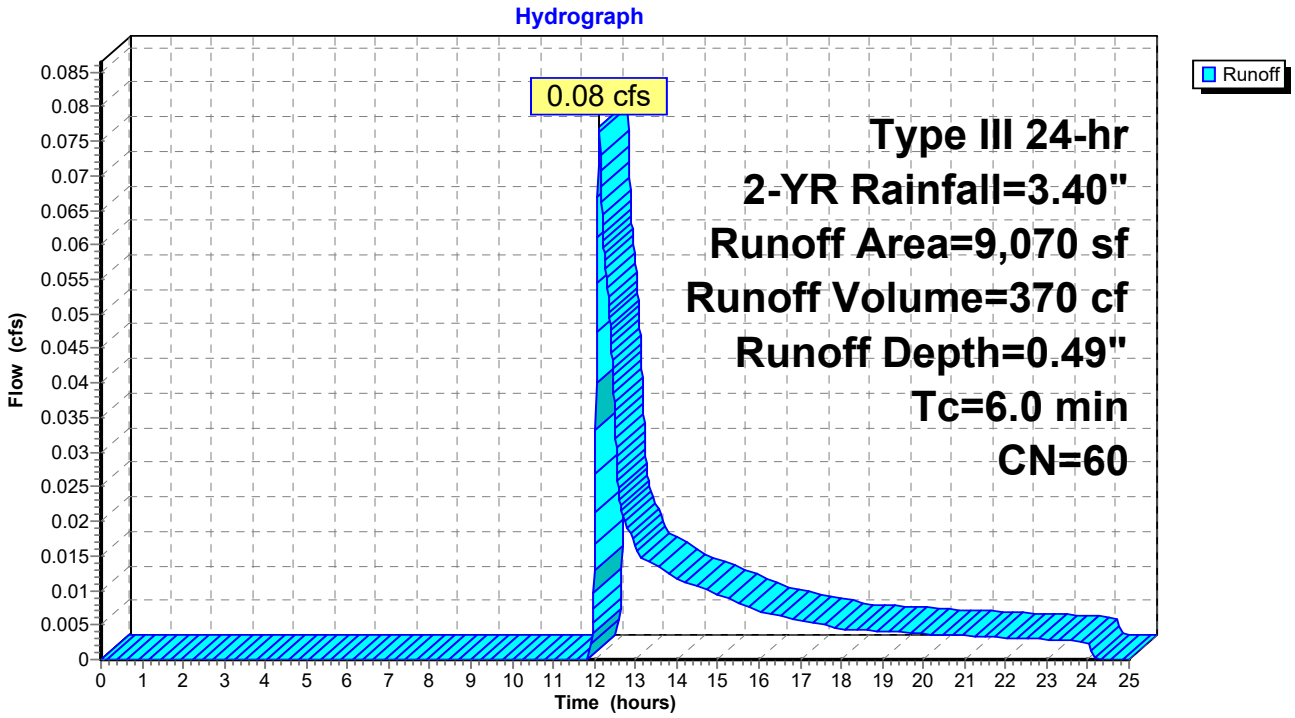
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 370 cf, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
3,210	98	Paved parking, HSG A
5,860	39	>75% Grass cover, Good, HSG A
9,070	60	Weighted Average
5,860		64.61% Pervious Area
3,210		35.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-6: Captured to CB 3&4



Summary for Subcatchment P-7: Flow to Basin 2

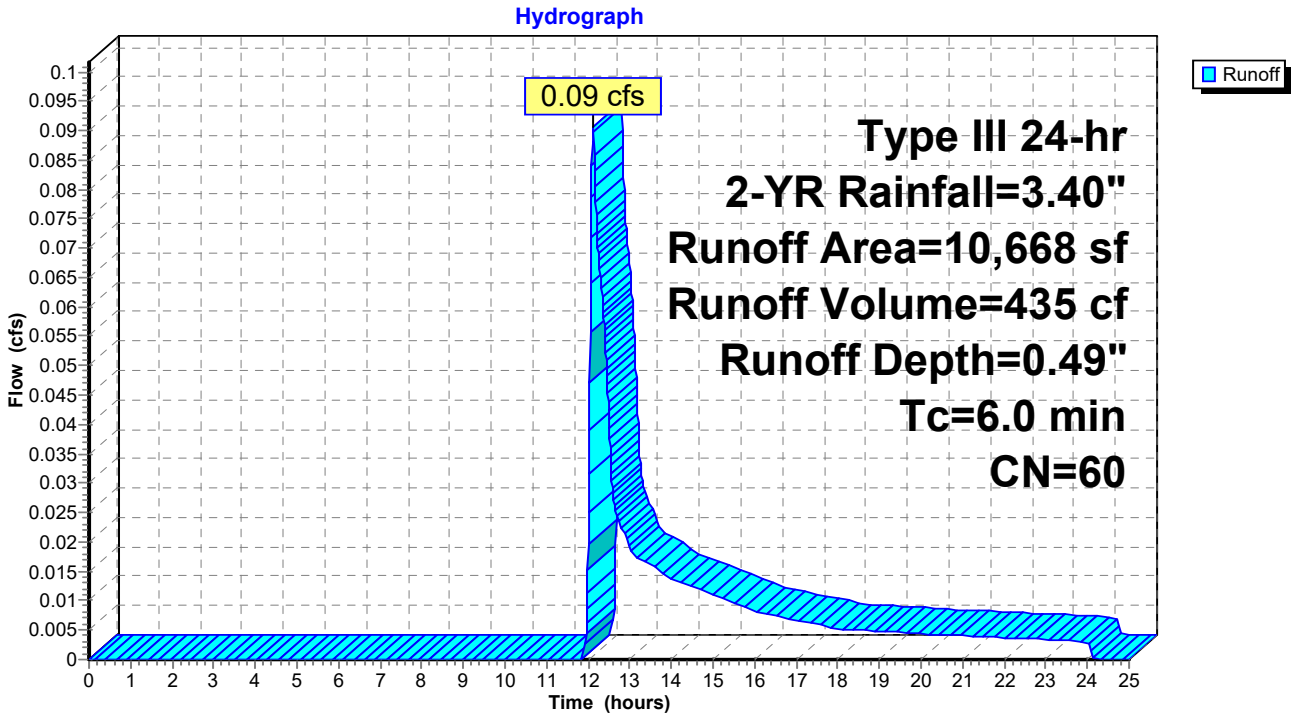
Runoff = 0.09 cfs @ 12.12 hrs, Volume= 435 cf, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR Rainfall=3.40"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
6,908	39	>75% Grass cover, Good, HSG A
10,668	60	Weighted Average
6,908		64.75% Pervious Area
3,760		35.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-7: Flow to Basin 2

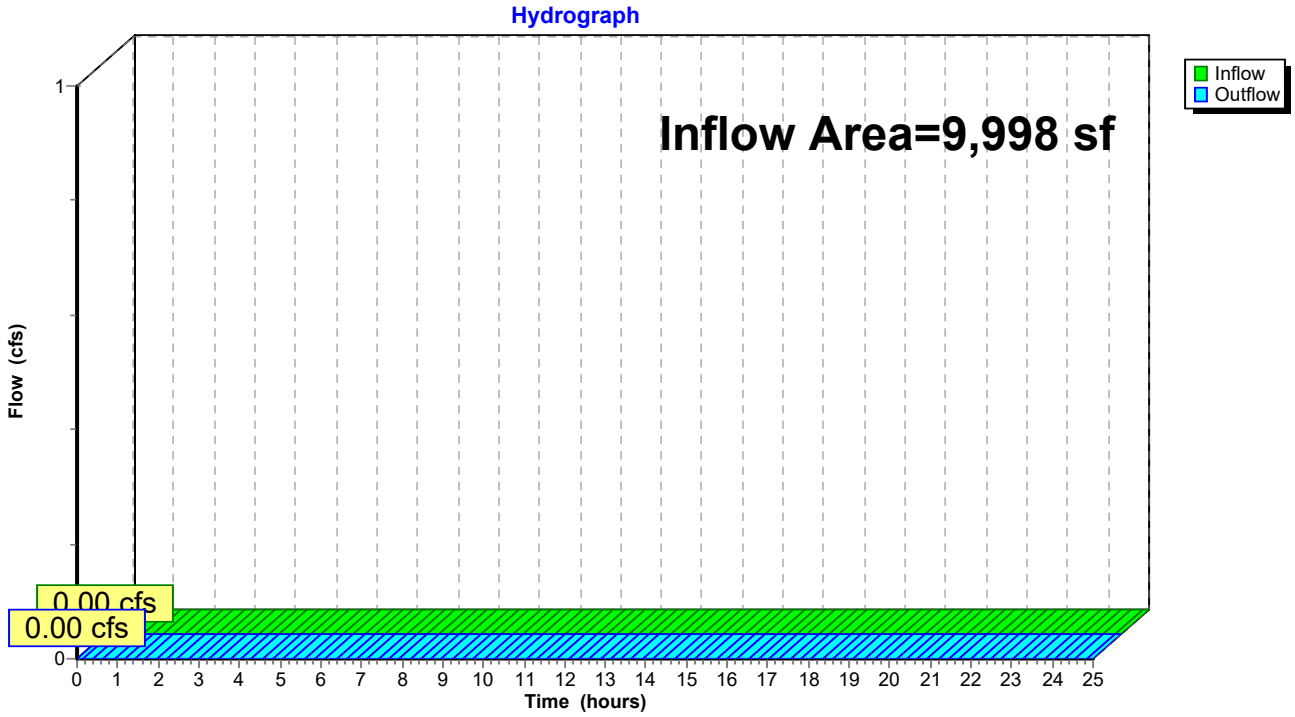


Summary for Reach 1R: Flow to Mill St

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 1R: Flow to Mill St

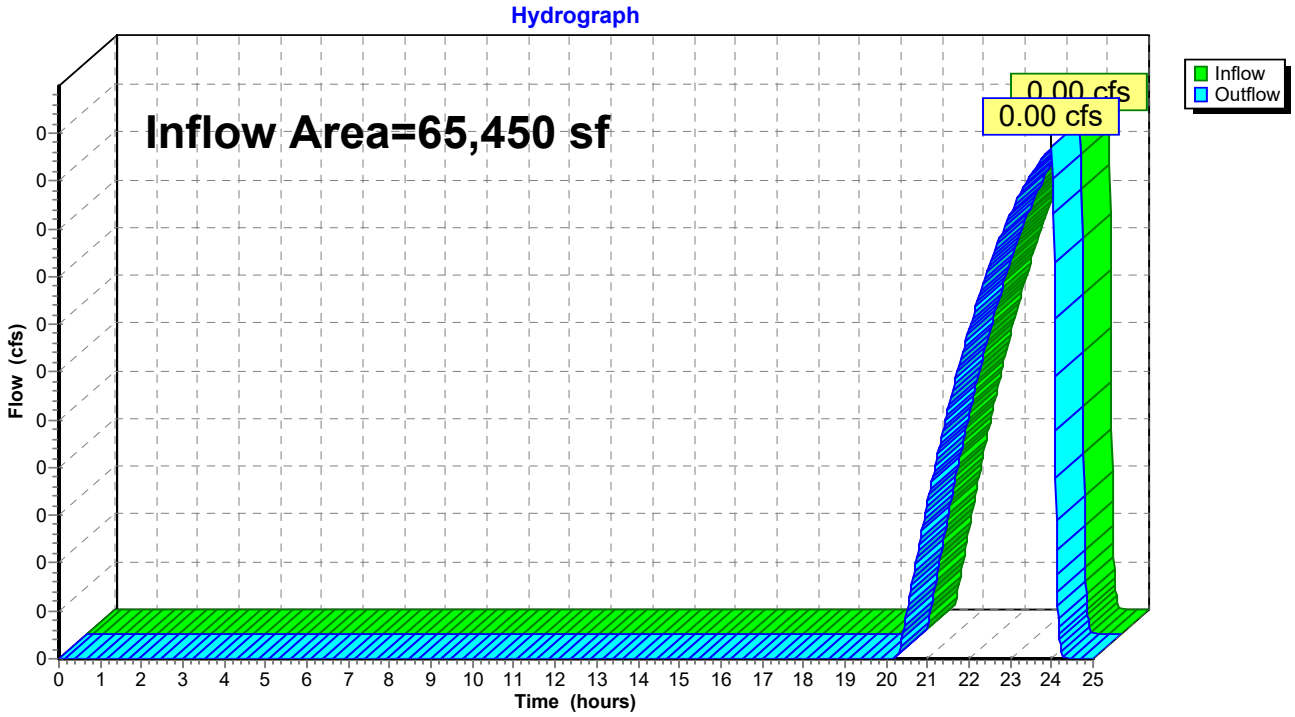


Summary for Reach 3R: Flow To Easterly Abutters

Inflow Area = 65,450 sf, 34.60% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 24.01 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 24.01 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 3R: Flow To Easterly Abutters



Summary for Pond 1P: UG System 1

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 0.75" for 2-YR event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 622 cf
Outflow = 0.06 cfs @ 12.01 hrs, Volume= 622 cf, Atten= 67%, Lag= 0.0 min
Discarded = 0.06 cfs @ 12.01 hrs, Volume= 622 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 123.06' @ 12.50 hrs Surf.Area= 293 sf Storage= 98 cf

Plug-Flow detention time= 9.2 min calculated for 622 cf (100% of inflow)
Center-of-Mass det. time= 9.2 min (894.9 - 885.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	122.00'	292 cf	**7.50'W x 39.00'L x 5.25'H Field A** 1,536 cf Overall - 561 cf Embedded = 975 cf x 30.0% Voids
#2A	123.00'	417 cf	**Shea Leaching Chamber 4x4x4** x 9 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	123.34'	5 cf	**10.0" Round Pipe Storage**-Impervious L= 9.3' S= 0.0050 '/'
#4	123.39'	11 cf	**10.0" Round Pipe Storage**-Impervious L= 20.1' S= 0.0050 '/'
#5	123.50'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**-Impervious
#6	126.50'	22 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) -Impervious
		785 cf	Total Available Storage

Storage Group A created with Chamber Wizard

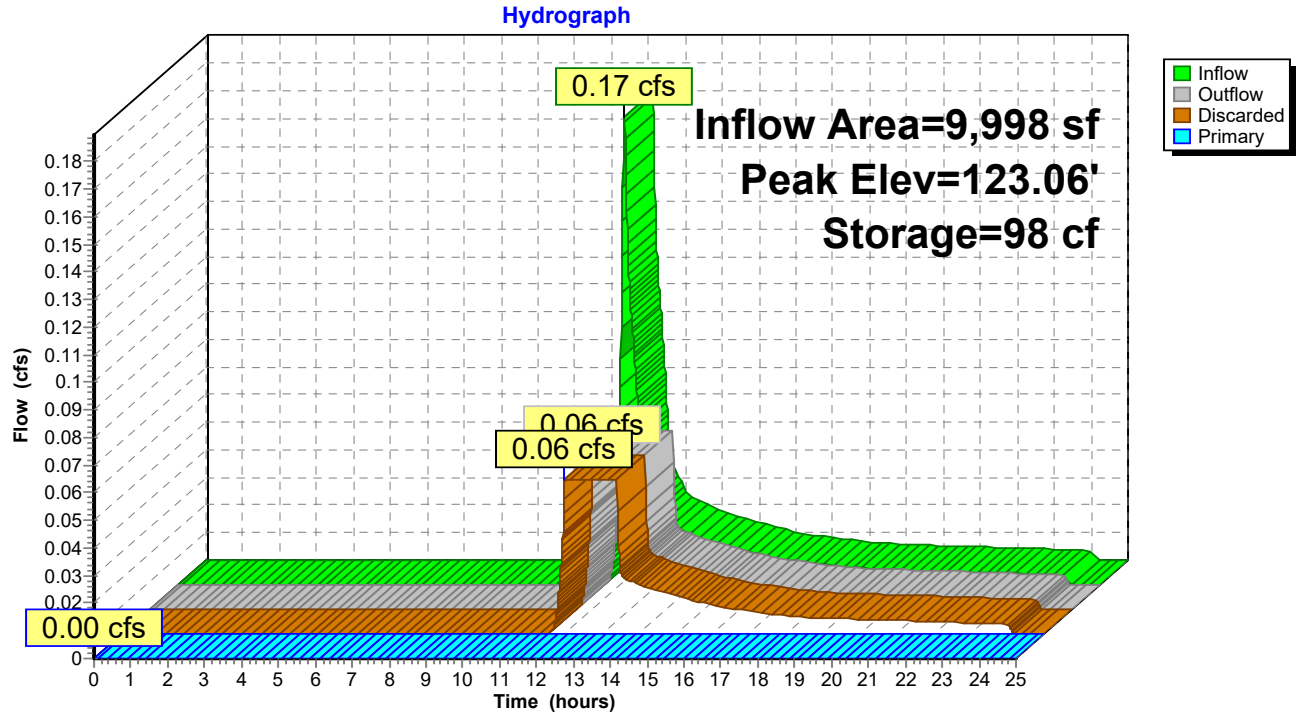
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.50	4	0	0
128.00	25	22	22

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	126.50'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 12.01 hrs HW=122.07' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: UG System 1



Summary for Pond 2P: UG System 2

Inflow Area = 9,070 sf, 35.39% Impervious, Inflow Depth = 0.49" for 2-YR event
Inflow = 0.08 cfs @ 12.12 hrs, Volume= 370 cf
Outflow = 0.07 cfs @ 12.11 hrs, Volume= 370 cf, Atten= 13%, Lag= 0.0 min
Discarded = 0.07 cfs @ 12.11 hrs, Volume= 370 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 128.82' @ 12.18 hrs Surf.Area= 350 sf Storage= 7 cf

Plug-Flow detention time= 1.4 min calculated for 369 cf (100% of inflow)
Center-of-Mass det. time= 1.4 min (913.8 - 912.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.75'	327 cf	**17.50'W x 20.00'L x 5.25'H Field A** 1,838 cf Overall - 748 cf Embedded = 1,090 cf x 30.0% Voids
#2A	129.75'	557 cf	**Shea Leaching Chamber 4x4x4** x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf 12 Chambers in 3 Rows
		883 cf	Total Available Storage

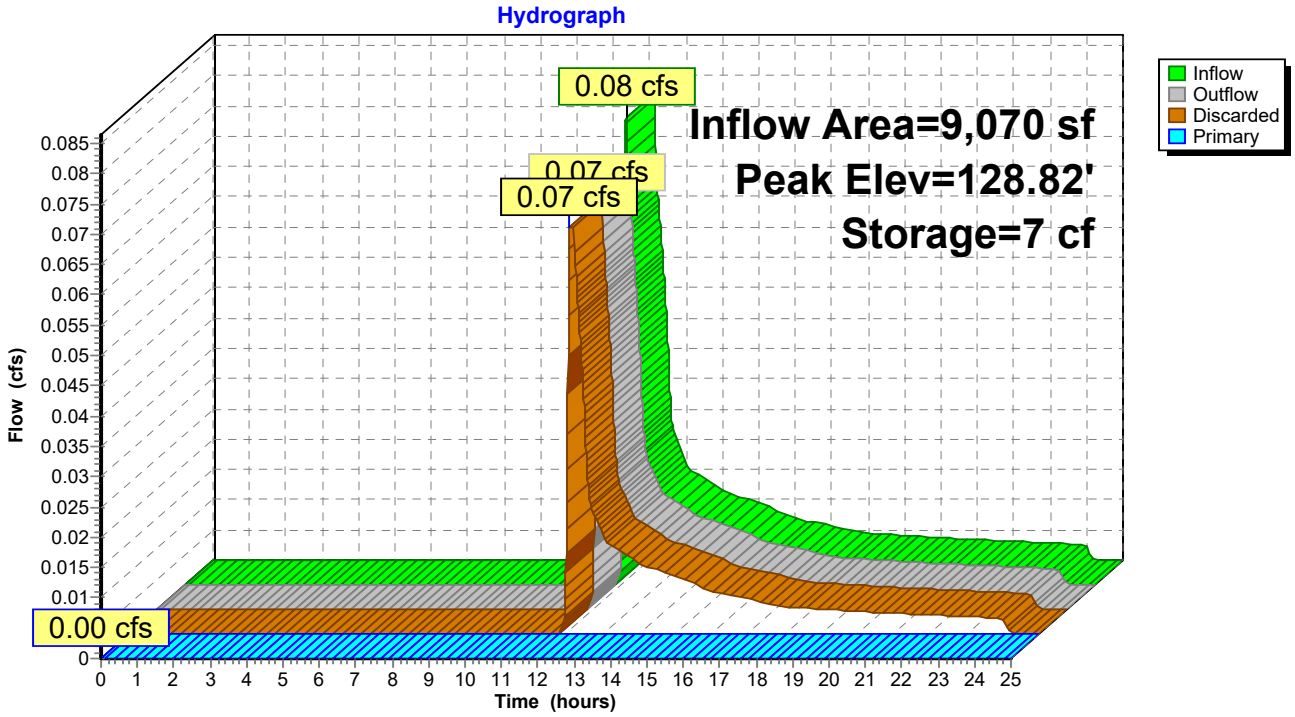
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	128.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.00'	**12.0" Round Culvert** L= 84.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.00' / 126.00' S= 0.0594 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.07 cfs @ 12.11 hrs HW=128.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.75' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 2P: UG System 2



Summary for Pond 3P: UG System 3

Inflow Area = 18,194 sf, 65.50% Impervious, Inflow Depth = 1.42" for 2-YR event
Inflow = 0.69 cfs @ 12.09 hrs, Volume= 2,156 cf
Outflow = 0.21 cfs @ 11.93 hrs, Volume= 2,156 cf, Atten= 70%, Lag= 0.0 min
Discarded = 0.21 cfs @ 11.93 hrs, Volume= 2,156 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 130.09' @ 12.46 hrs Surf.Area= 1,072 sf Storage= 385 cf

Plug-Flow detention time= 9.9 min calculated for 2,155 cf (100% of inflow)
Center-of-Mass det. time= 9.9 min (855.8 - 845.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	835 cf	**15.76'W x 68.00'L x 4.50'H Field A** 4,823 cf Overall - 2,039 cf Embedded = 2,784 cf x 30.0% Voids
#2A	130.00'	1,464 cf	**Shea Leaching Chamber 4x4x3** x 48 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 48 Chambers in 3 Rows
		2,299 cf	Total Available Storage

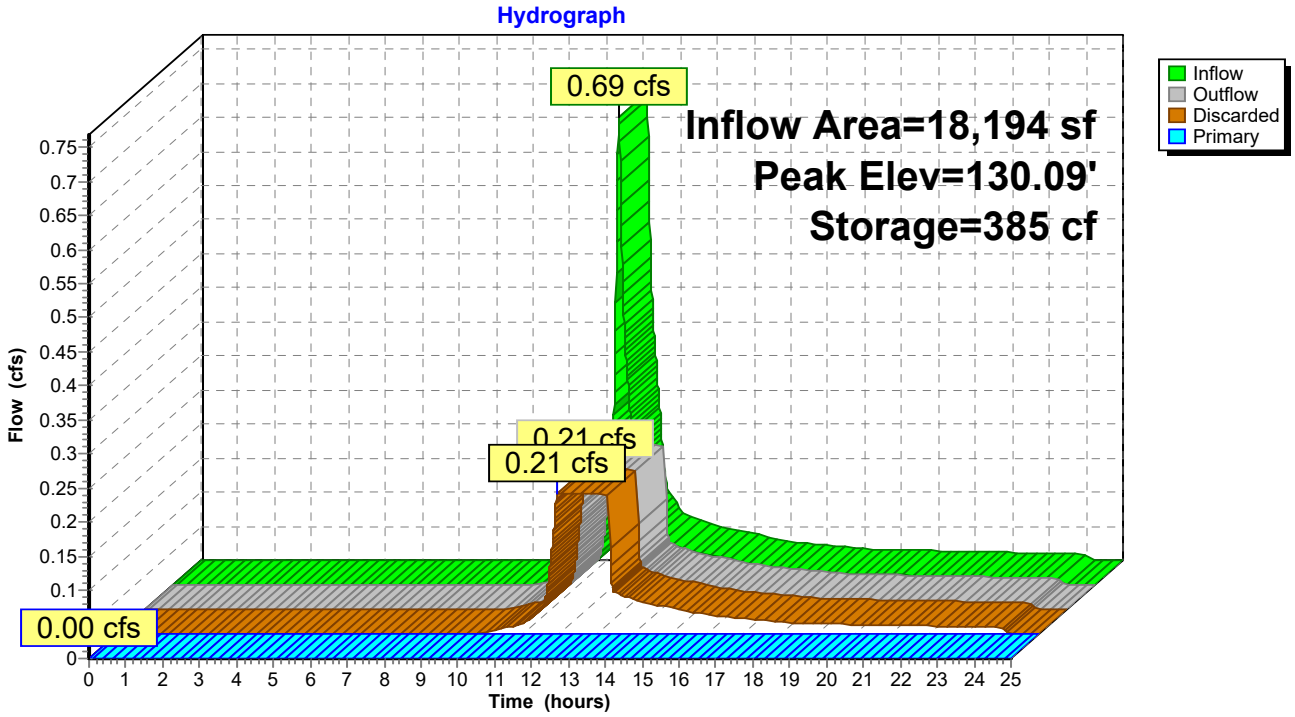
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	129.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.50'	**10.0" Round Culvert** L= 56.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.50' / 128.00' S= 0.0619 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.21 cfs @ 11.93 hrs HW=129.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=129.00' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)

Pond 3P: UG System 3



Summary for Pond 4P: Basin 1

Inflow Area = 40,849 sf, 38.38% Impervious, Inflow Depth = 0.07" for 2-YR event
Inflow = 0.01 cfs @ 12.49 hrs, Volume= 238 cf
Outflow = 0.01 cfs @ 12.52 hrs, Volume= 238 cf, Atten= 2%, Lag= 1.8 min
Discarded = 0.01 cfs @ 12.52 hrs, Volume= 238 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 126.00' @ 12.52 hrs Surf.Area= 941 sf Storage= 1 cf

Plug-Flow detention time= 1.7 min calculated for 238 cf (100% of inflow)
Center-of-Mass det. time= 1.7 min (1,018.7 - 1,017.0)

Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	3,407 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

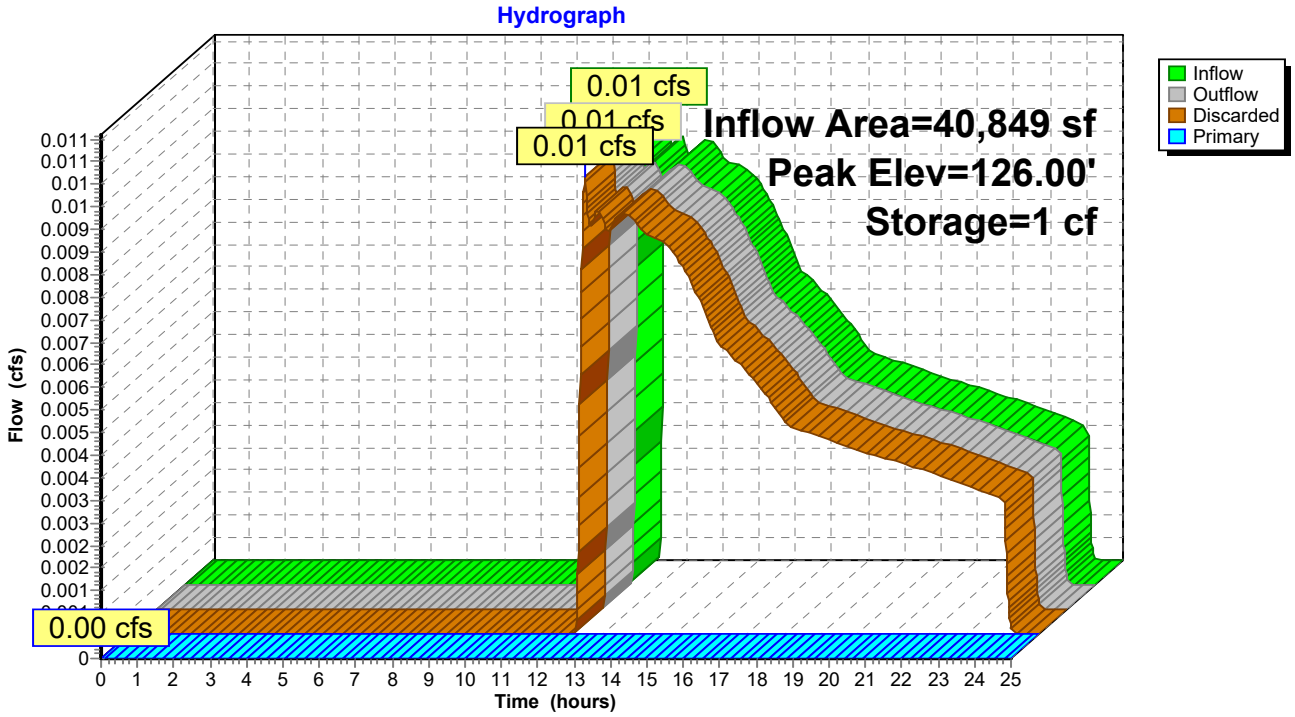
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.00	940	0	0
128.00	2,467	3,407	3,407

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	127.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.18 cfs @ 12.52 hrs HW=126.00' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=126.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4P: Basin 1



Summary for Pond 5P: Basin 2

Inflow Area = 19,738 sf, 35.31% Impervious, Inflow Depth = 0.26" for 2-YR event
Inflow = 0.09 cfs @ 12.12 hrs, Volume= 435 cf
Outflow = 0.09 cfs @ 12.15 hrs, Volume= 435 cf, Atten= 5%, Lag= 1.9 min
Discarded = 0.09 cfs @ 12.15 hrs, Volume= 435 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 124.02' @ 12.15 hrs Surf.Area= 514 sf Storage= 9 cf

Plug-Flow detention time= 1.7 min calculated for 435 cf (100% of inflow)
Center-of-Mass det. time= 1.7 min (914.1 - 912.4)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,971 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

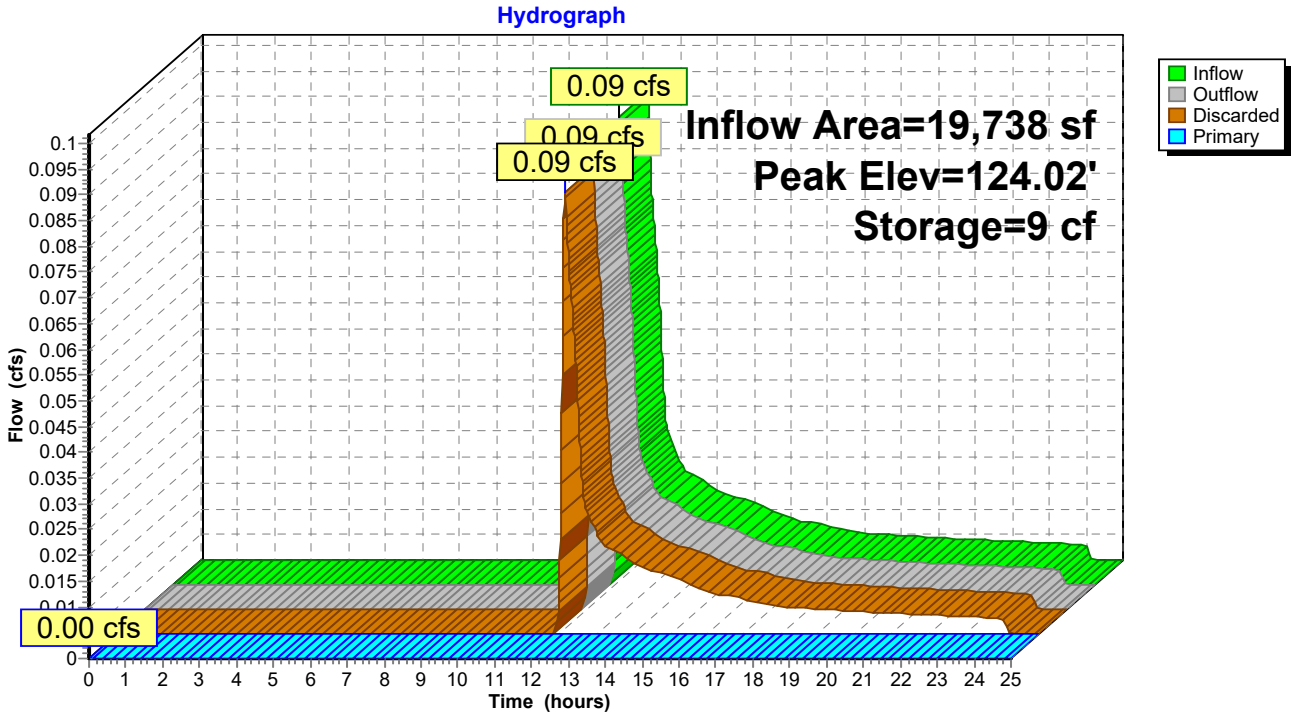
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.00	506	0	0
126.00	1,465	1,971	1,971

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	125.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.10 cfs @ 12.15 hrs HW=124.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=124.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Basin 2



Summary for Subcatchment P-1: Captured to Mill St

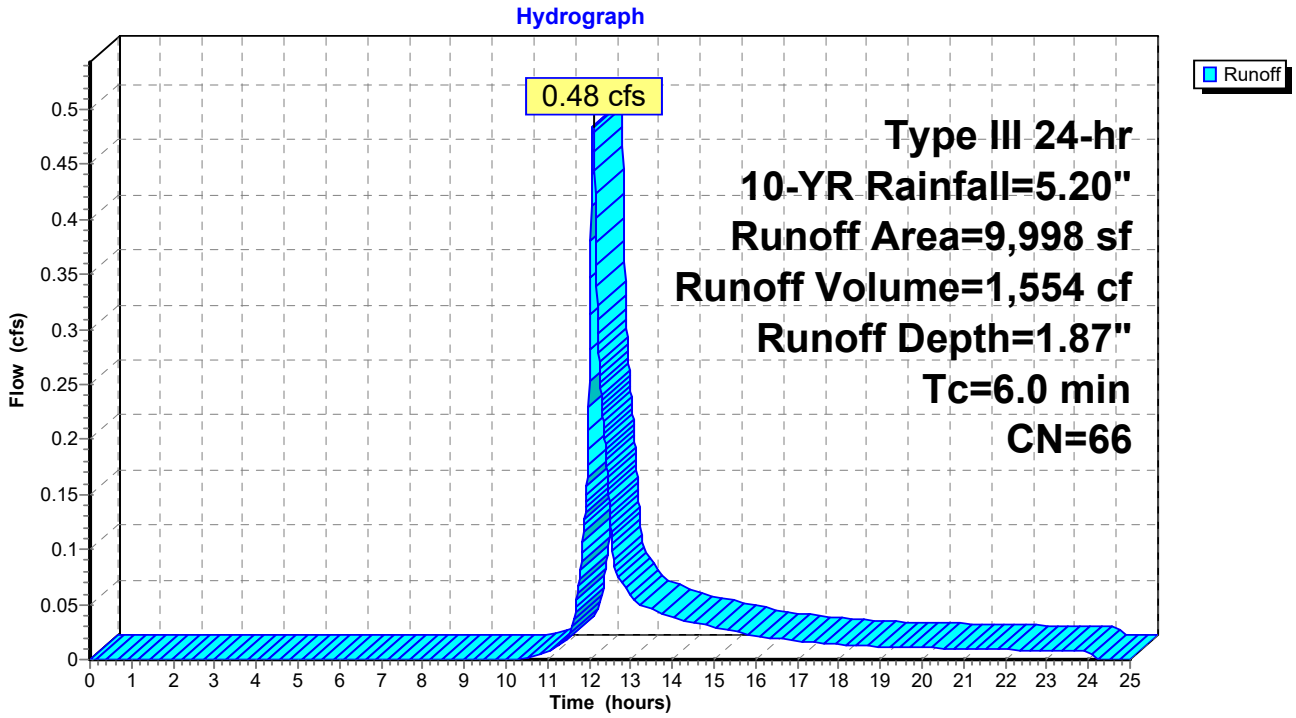
Runoff = 0.48 cfs @ 12.09 hrs, Volume= 1,554 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
4,541	98	Paved parking, HSG A
5,457	39	>75% Grass cover, Good, HSG A
9,998	66	Weighted Average
5,457		54.58% Pervious Area
4,541		45.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-1: Captured to Mill St



Summary for Subcatchment P-2: Flow to Northeasterly Abutters

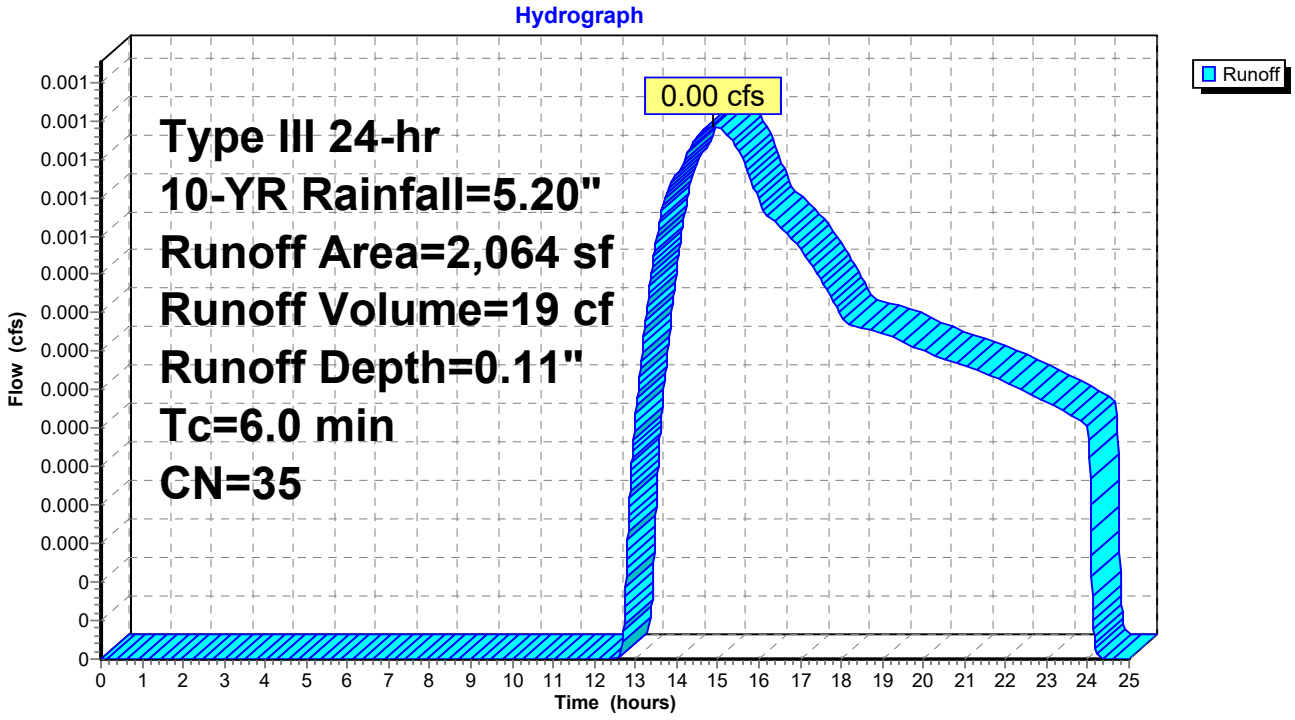
Runoff = 0.00 cfs @ 14.86 hrs, Volume= 19 cf, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,033	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
1,031	30	Woods, Good, HSG A
2,064	35	Weighted Average
2,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-2: Flow to Northeasterly Abutters



Summary for Subcatchment P-3: Uncaptured to Easterly Abutters

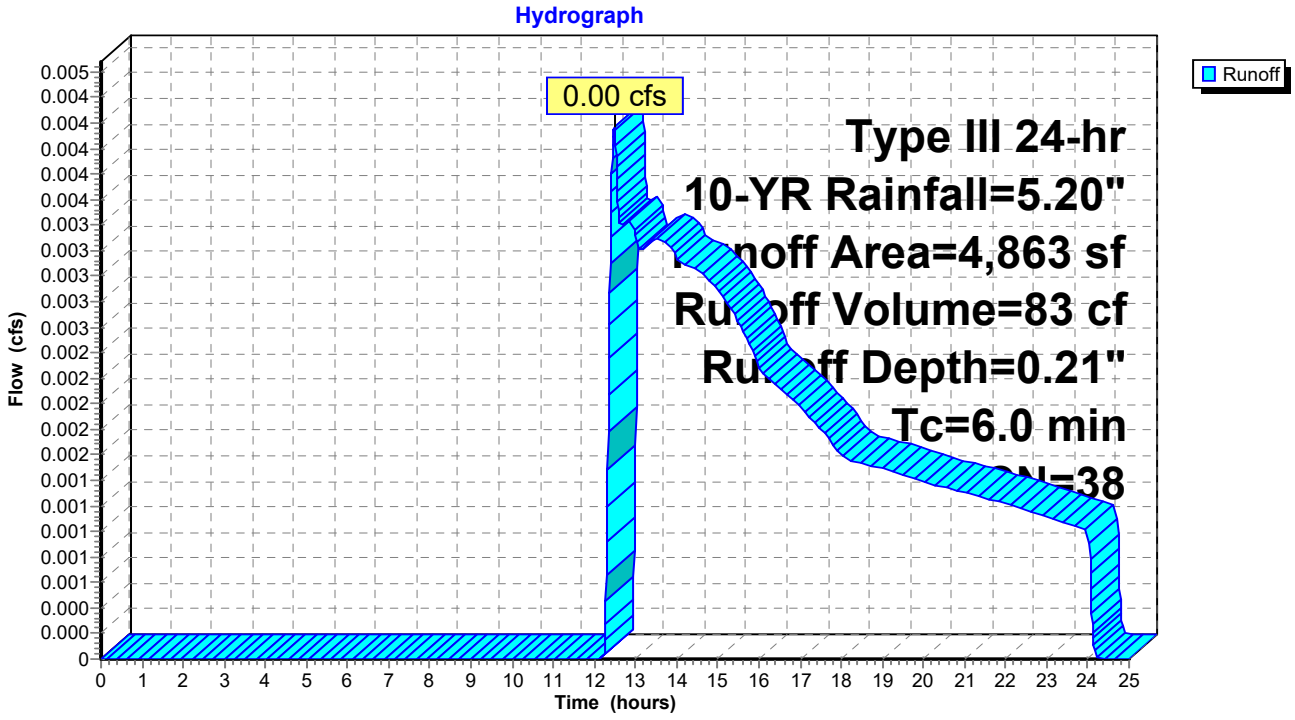
Runoff = 0.00 cfs @ 12.48 hrs, Volume= 83 cf, Depth= 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
4,429	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
434	30	Woods, Good, HSG A
4,863	38	Weighted Average
4,863		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-3: Uncaptured to Easterly Abutters



Summary for Subcatchment P-4: Flow to Basin 1

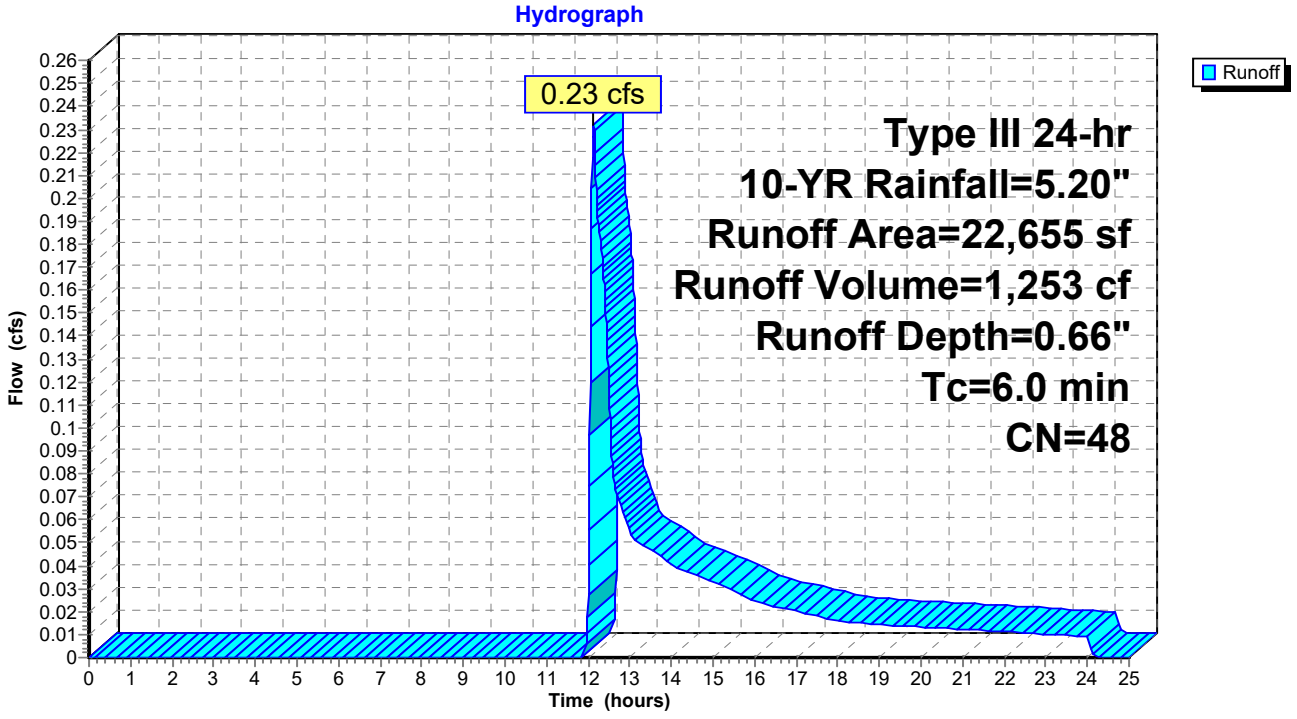
Runoff = 0.23 cfs @ 12.13 hrs, Volume= 1,253 cf, Depth= 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
17,923	39	>75% Grass cover, Good, HSG A
0	98	Paved parking, HSG A
972	30	Woods, Good, HSG A
22,655	48	Weighted Average
18,895		83.40% Pervious Area
3,760		16.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-4: Flow to Basin 1



Summary for Subcatchment P-5: Flow to CB 5

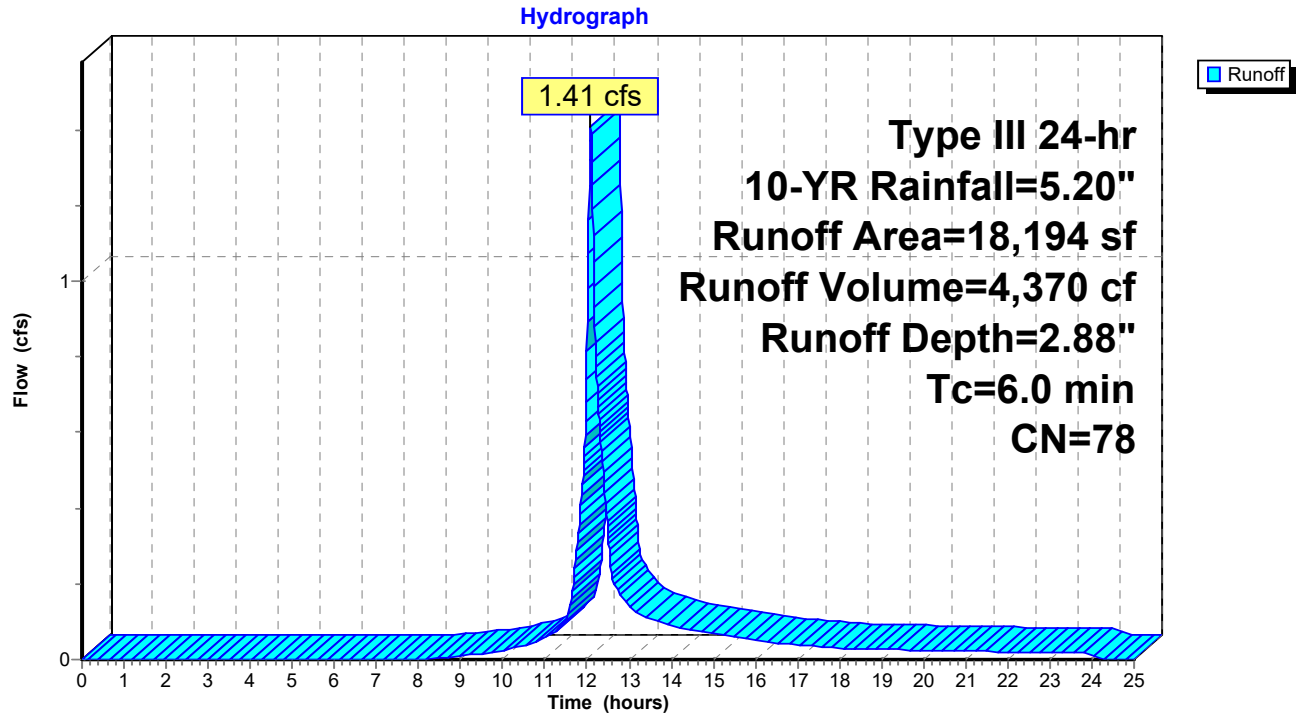
Runoff = 1.41 cfs @ 12.09 hrs, Volume= 4,370 cf, Depth= 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
11,917	98	Paved parking, HSG A
6,277	39	>75% Grass cover, Good, HSG A
18,194	78	Weighted Average
6,277		34.50% Pervious Area
11,917		65.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-5: Flow to CB 5



Summary for Subcatchment P-6: Captured to CB 3&4

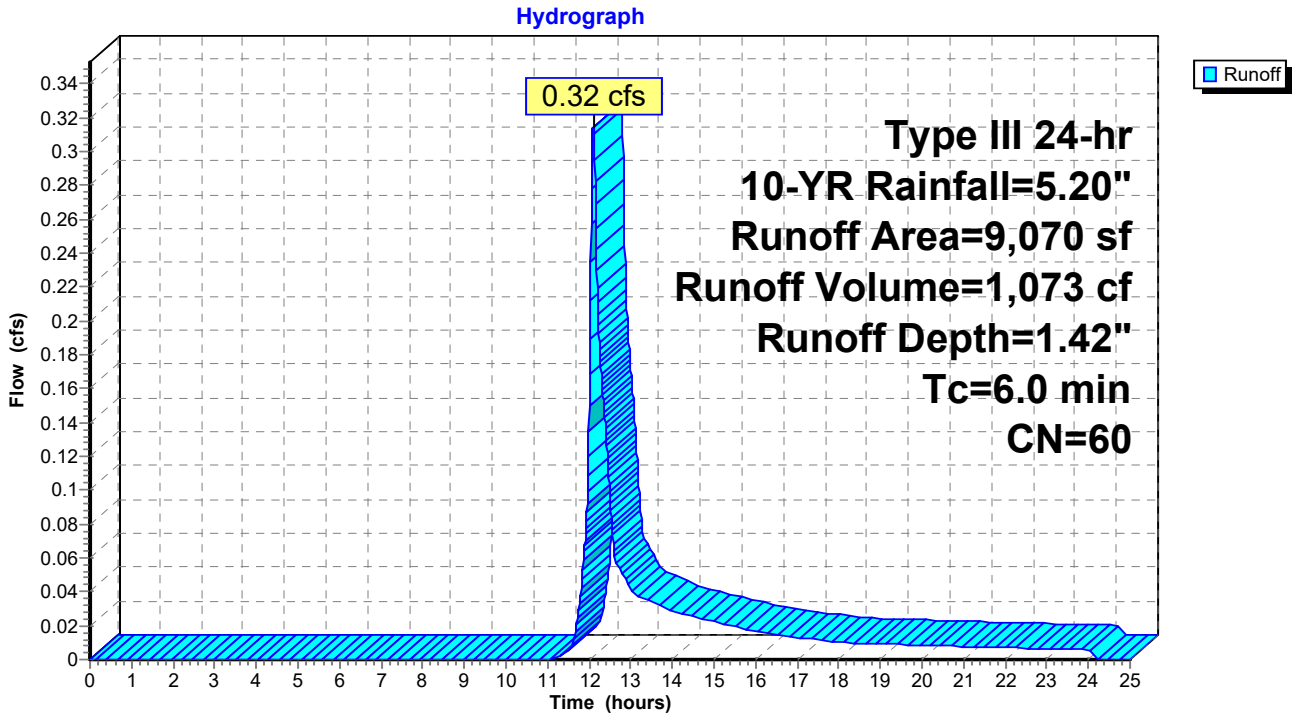
Runoff = 0.32 cfs @ 12.10 hrs, Volume= 1,073 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
3,210	98	Paved parking, HSG A
5,860	39	>75% Grass cover, Good, HSG A
9,070	60	Weighted Average
5,860		64.61% Pervious Area
3,210		35.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-6: Captured to CB 3&4



Summary for Subcatchment P-7: Flow to Basin 2

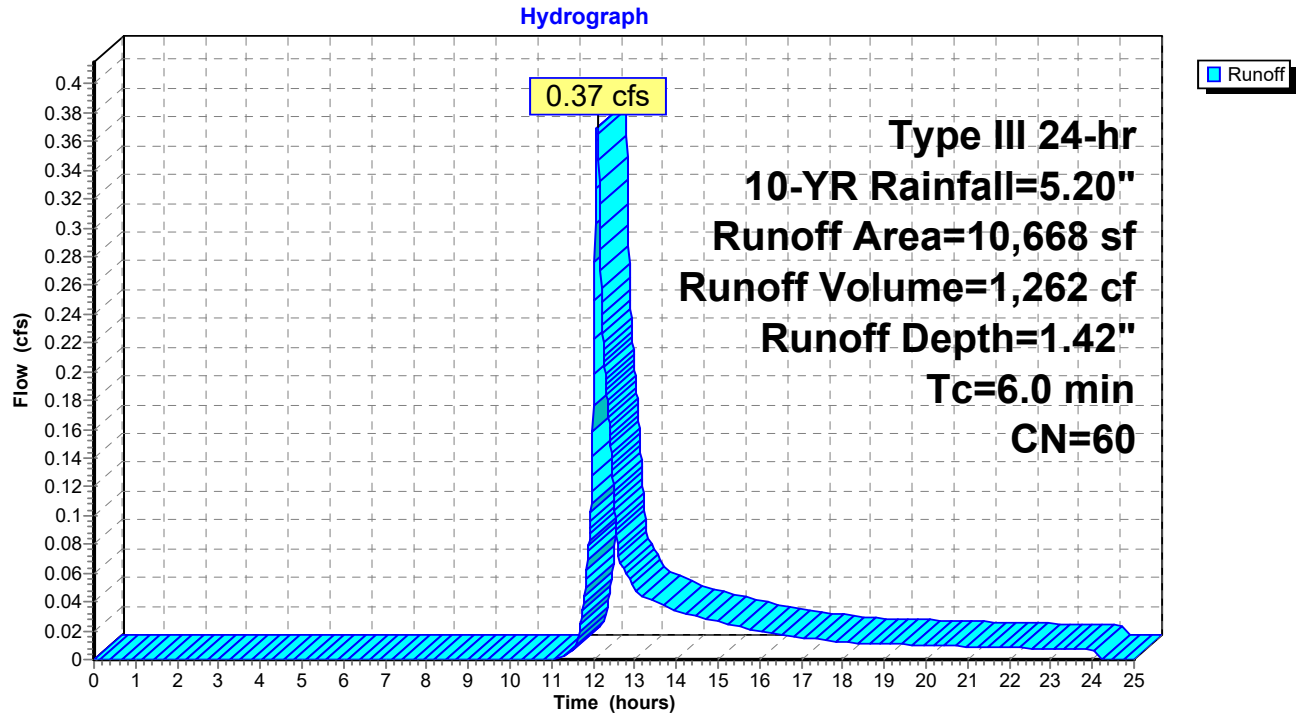
Runoff = 0.37 cfs @ 12.10 hrs, Volume= 1,262 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR Rainfall=5.20"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
6,908	39	>75% Grass cover, Good, HSG A
10,668	60	Weighted Average
6,908		64.75% Pervious Area
3,760		35.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-7: Flow to Basin 2

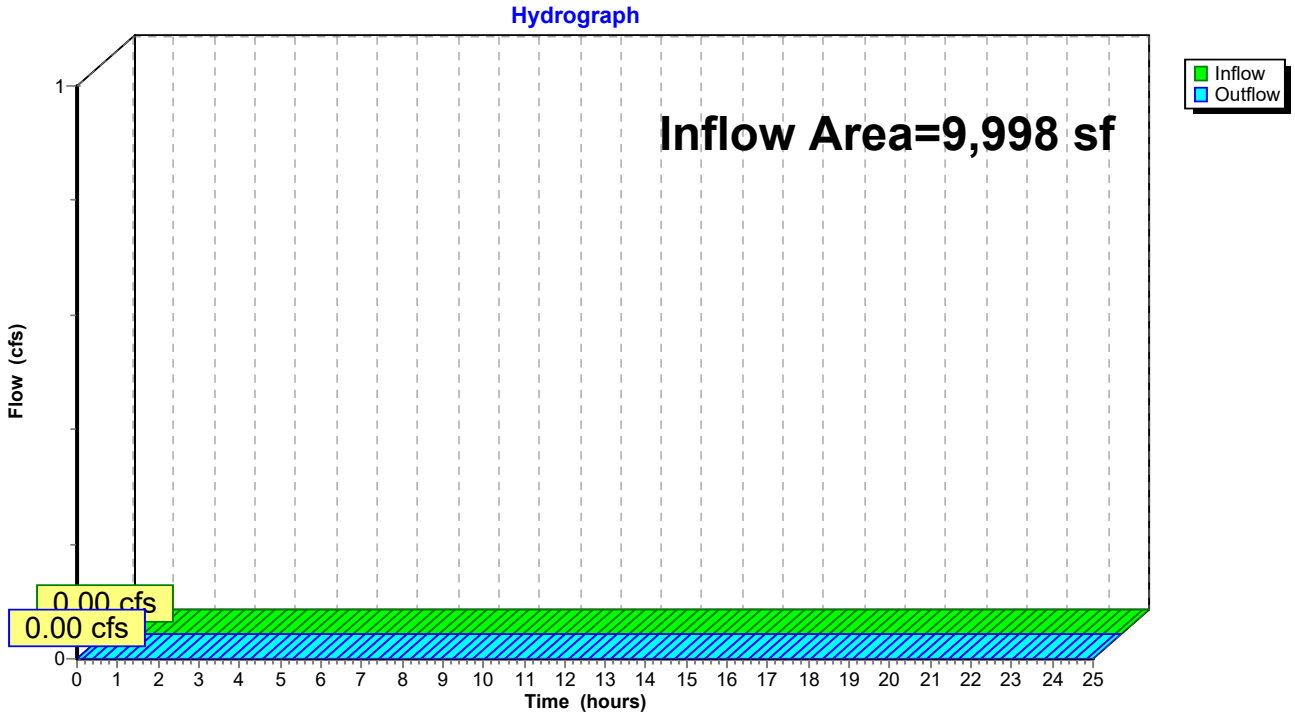


Summary for Reach 1R: Flow to Mill St

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 1R: Flow to Mill St

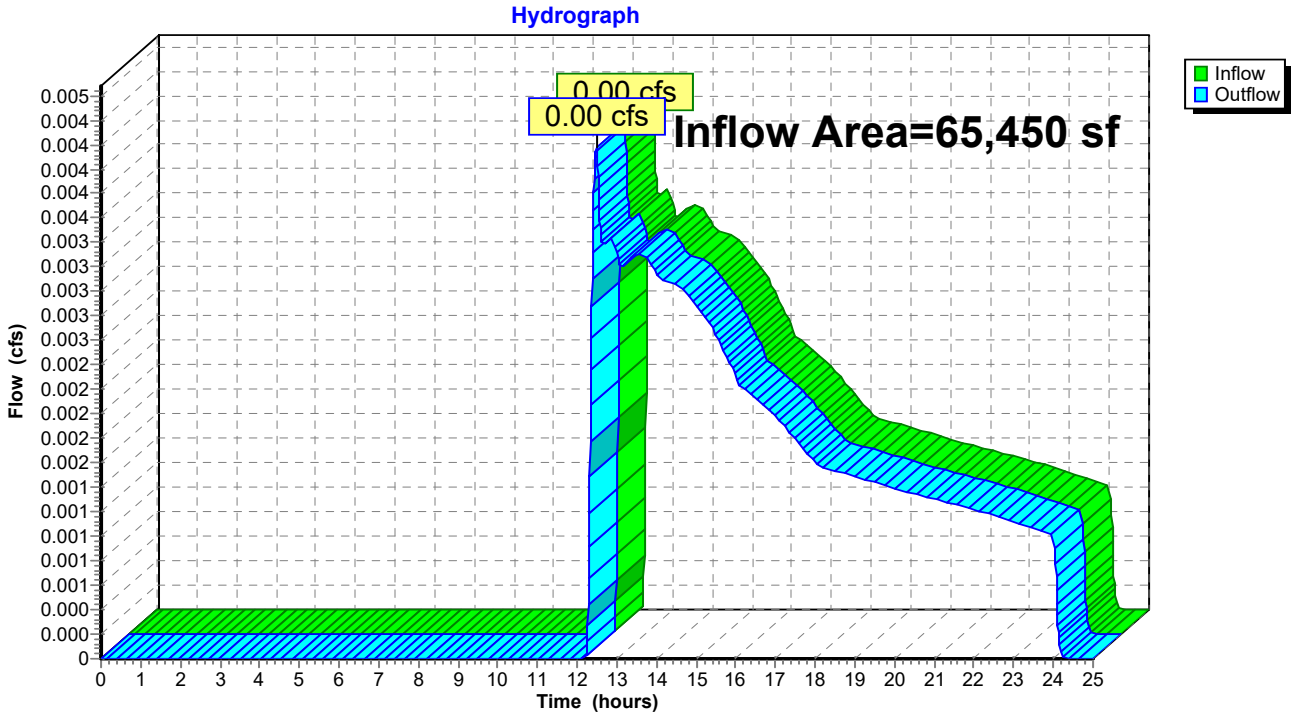


Summary for Reach 3R: Flow To Easterly Abutters

Inflow Area = 65,450 sf, 34.60% Impervious, Inflow Depth = 0.02" for 10-YR event
Inflow = 0.00 cfs @ 12.48 hrs, Volume= 83 cf
Outflow = 0.00 cfs @ 12.48 hrs, Volume= 83 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 3R: Flow To Easterly Abutters



Summary for Pond 1P: UG System 1

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 1.87" for 10-YR event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 1,554 cf
Outflow = 0.06 cfs @ 11.74 hrs, Volume= 1,554 cf, Atten= 88%, Lag= 0.0 min
Discarded = 0.06 cfs @ 11.74 hrs, Volume= 1,554 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 125.48' @ 13.02 hrs Surf.Area= 293 sf Storage= 525 cf

Plug-Flow detention time= 80.2 min calculated for 1,553 cf (100% of inflow)
Center-of-Mass det. time= 80.2 min (936.0 - 855.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	122.00'	292 cf	**7.50'W x 39.00'L x 5.25'H Field A** 1,536 cf Overall - 561 cf Embedded = 975 cf x 30.0% Voids
#2A	123.00'	417 cf	**Shea Leaching Chamber 4x4x4** x 9 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	123.34'	5 cf	**10.0" Round Pipe Storage**-Impervious L= 9.3' S= 0.0050 '/'
#4	123.39'	11 cf	**10.0" Round Pipe Storage**-Impervious L= 20.1' S= 0.0050 '/'
#5	123.50'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**-Impervious
#6	126.50'	22 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) -Impervious
		785 cf	Total Available Storage

Storage Group A created with Chamber Wizard

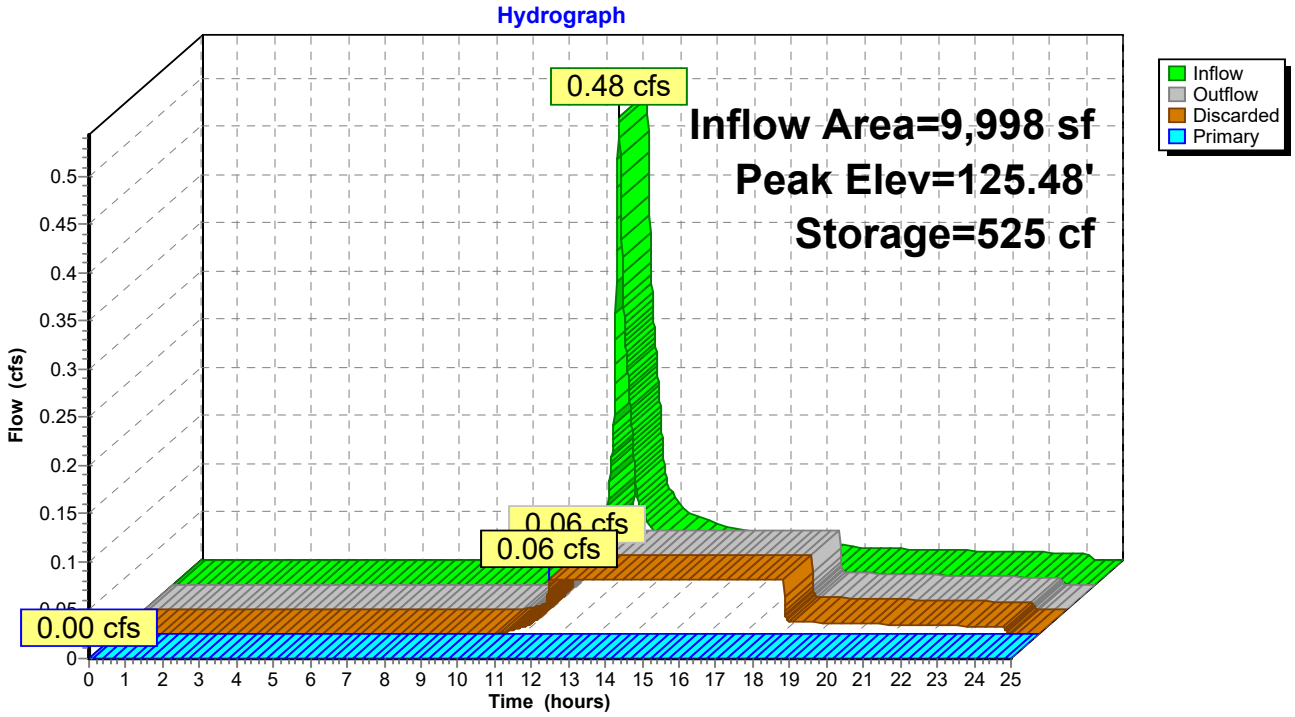
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.50	4	0	0
128.00	25	22	22

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	126.50'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 11.74 hrs HW=122.06' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=122.00' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: UG System 1



Summary for Pond 2P: UG System 2

Inflow Area = 9,070 sf, 35.39% Impervious, Inflow Depth = 1.42" for 10-YR event
Inflow = 0.32 cfs @ 12.10 hrs, Volume= 1,073 cf
Outflow = 0.07 cfs @ 11.92 hrs, Volume= 1,073 cf, Atten= 79%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.92 hrs, Volume= 1,073 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 130.46' @ 12.58 hrs Surf.Area= 350 sf Storage= 248 cf

Plug-Flow detention time= 23.3 min calculated for 1,072 cf (100% of inflow)
Center-of-Mass det. time= 23.3 min (895.8 - 872.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.75'	327 cf	**17.50'W x 20.00'L x 5.25'H Field A** 1,838 cf Overall - 748 cf Embedded = 1,090 cf x 30.0% Voids
#2A	129.75'	557 cf	**Shea Leaching Chamber 4x4x4** x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf 12 Chambers in 3 Rows
		883 cf	Total Available Storage

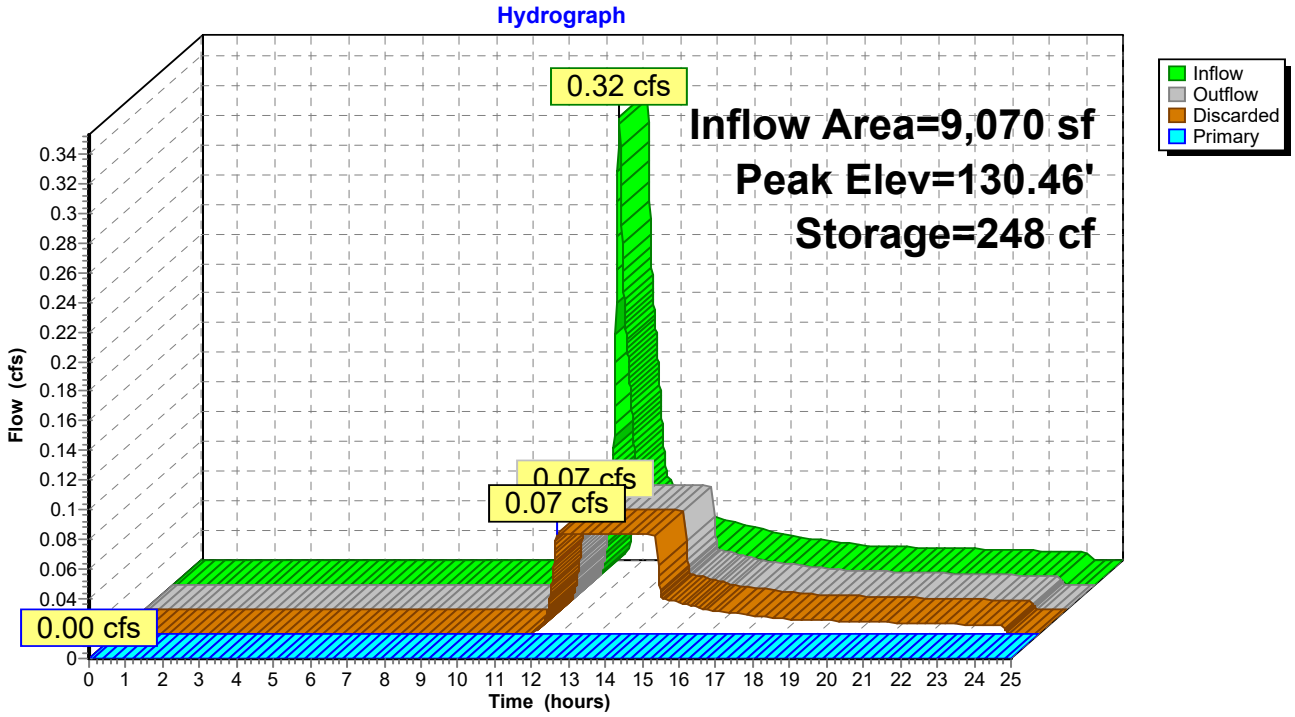
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	128.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.00'	**12.0" Round Culvert** L= 84.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.00' / 126.00' S= 0.0594 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.07 cfs @ 11.92 hrs HW=128.81' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=128.75' (Free Discharge)
↑—**2=Culvert** (Controls 0.00 cfs)

Pond 2P: UG System 2



Summary for Pond 3P: UG System 3

Inflow Area = 18,194 sf, 65.50% Impervious, Inflow Depth = 2.88" for 10-YR event
Inflow = 1.41 cfs @ 12.09 hrs, Volume= 4,370 cf
Outflow = 0.21 cfs @ 11.70 hrs, Volume= 4,370 cf, Atten= 85%, Lag= 0.0 min
Discarded = 0.21 cfs @ 11.70 hrs, Volume= 4,370 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 131.44' @ 12.63 hrs Surf.Area= 1,072 sf Storage= 1,342 cf

Plug-Flow detention time= 45.4 min calculated for 4,368 cf (100% of inflow)
Center-of-Mass det. time= 45.4 min (870.7 - 825.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	835 cf	**15.76'W x 68.00'L x 4.50'H Field A** 4,823 cf Overall - 2,039 cf Embedded = 2,784 cf x 30.0% Voids
#2A	130.00'	1,464 cf	**Shea Leaching Chamber 4x4x3** x 48 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 48 Chambers in 3 Rows
		2,299 cf	Total Available Storage

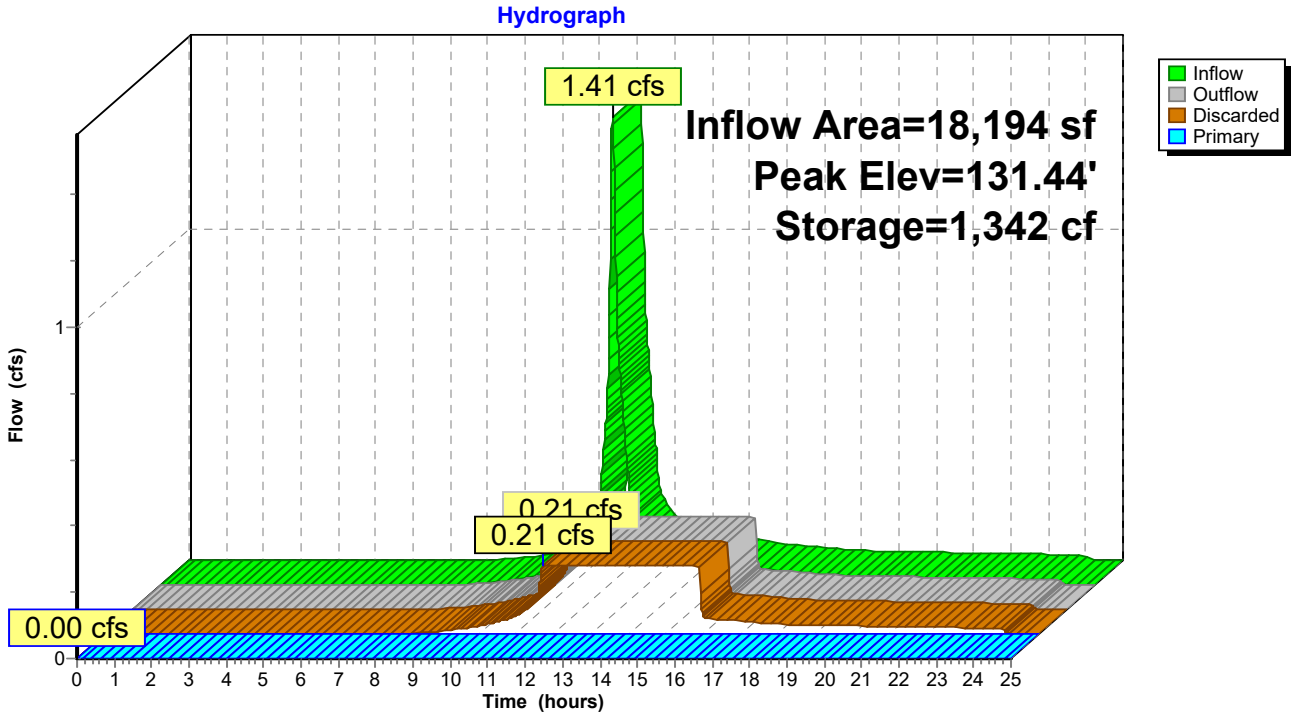
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	129.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.50'	**10.0" Round Culvert** L= 56.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.50' / 128.00' S= 0.0619 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.21 cfs @ 11.70 hrs HW=129.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=129.00' (Free Discharge)
↑**2=Culvert** (Controls 0.00 cfs)

Pond 3P: UG System 3



Summary for Pond 4P: Basin 1

Inflow Area = 40,849 sf, 38.38% Impervious, Inflow Depth = 0.37" for 10-YR event
Inflow = 0.23 cfs @ 12.13 hrs, Volume= 1,253 cf
Outflow = 0.18 cfs @ 12.28 hrs, Volume= 1,253 cf, Atten= 20%, Lag= 8.9 min
Discarded = 0.18 cfs @ 12.28 hrs, Volume= 1,253 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 126.03' @ 12.28 hrs Surf.Area= 966 sf Storage= 32 cf

Plug-Flow detention time= 1.9 min calculated for 1,253 cf (100% of inflow)
Center-of-Mass det. time= 1.9 min (922.3 - 920.4)

Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	3,407 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

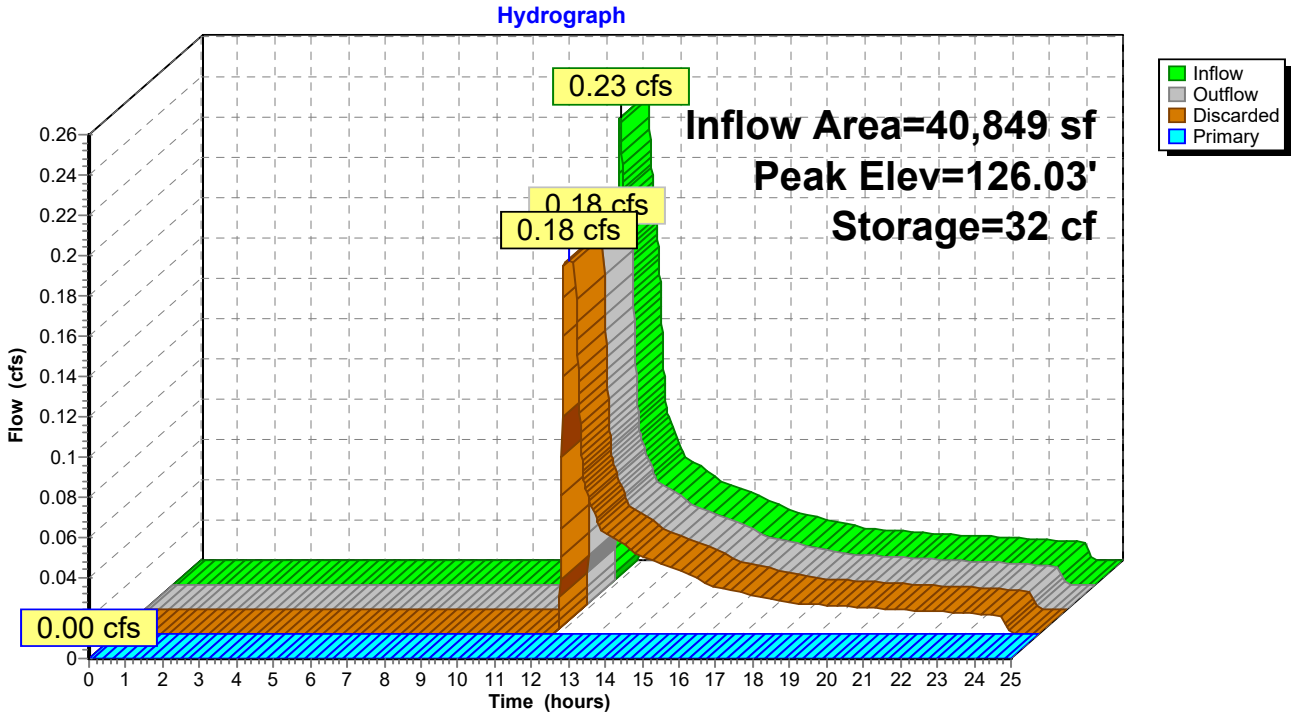
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.00	940	0	0
128.00	2,467	3,407	3,407

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	127.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.18 cfs @ 12.28 hrs HW=126.03' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=126.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 4P: Basin 1



Summary for Pond 5P: Basin 2

Inflow Area = 19,738 sf, 35.31% Impervious, Inflow Depth = 0.77" for 10-YR event
Inflow = 0.37 cfs @ 12.10 hrs, Volume= 1,262 cf
Outflow = 0.13 cfs @ 12.46 hrs, Volume= 1,262 cf, Atten= 65%, Lag= 21.9 min
Discarded = 0.13 cfs @ 12.46 hrs, Volume= 1,262 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 124.35' @ 12.46 hrs Surf.Area= 676 sf Storage= 209 cf

Plug-Flow detention time= 9.5 min calculated for 1,261 cf (100% of inflow)
Center-of-Mass det. time= 9.5 min (882.0 - 872.5)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,971 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

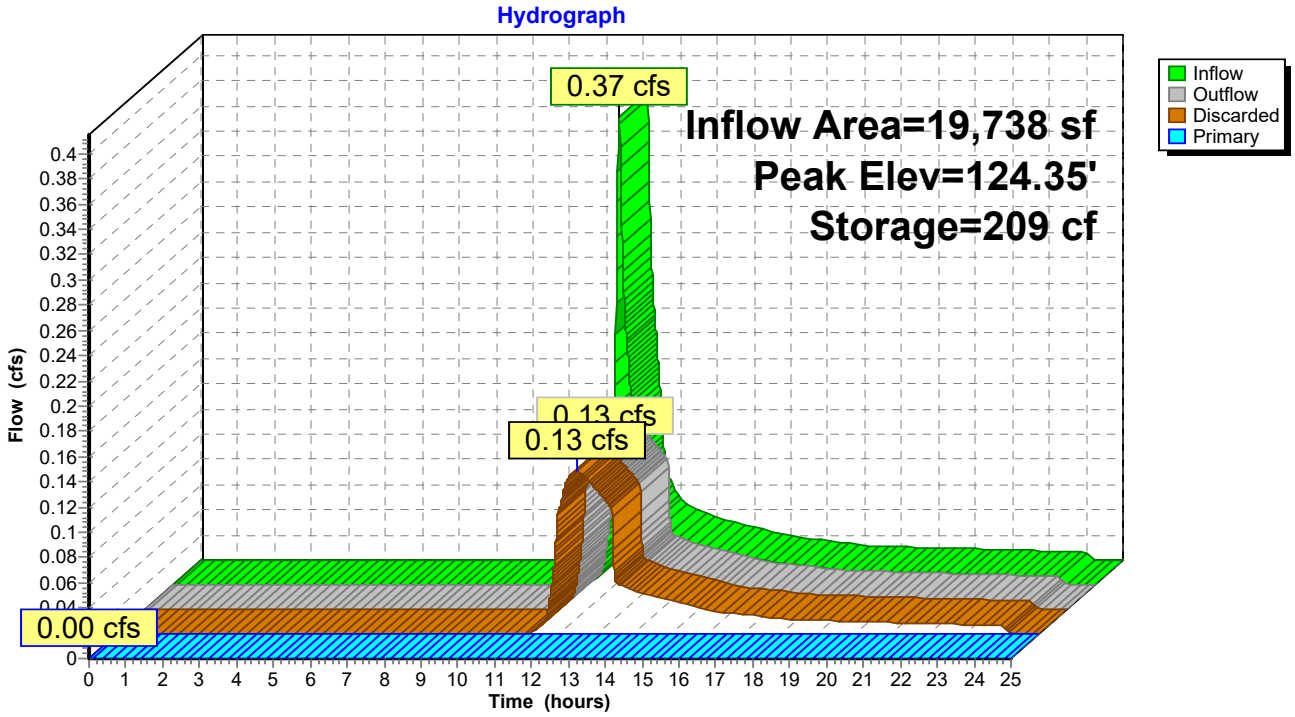
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.00	506	0	0
126.00	1,465	1,971	1,971

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	125.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.13 cfs @ 12.46 hrs HW=124.35' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=124.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Basin 2



Summary for Subcatchment P-1: Captured to Mill St

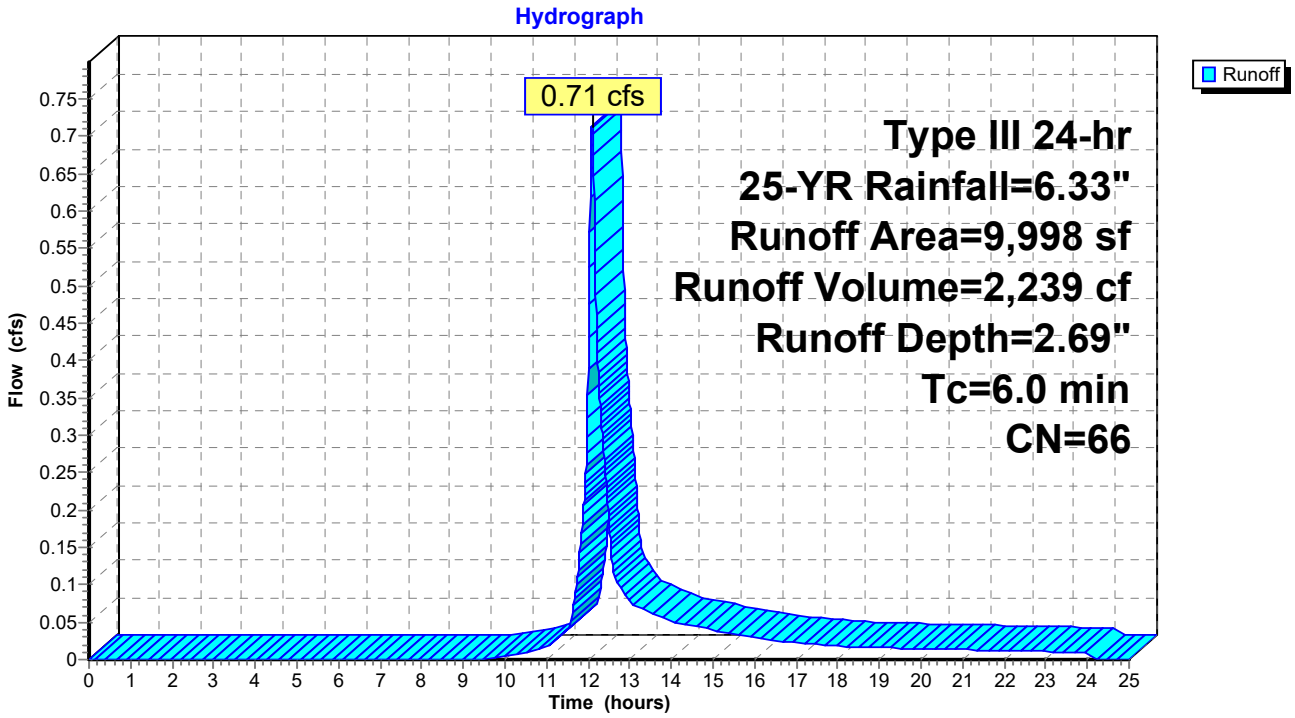
Runoff = 0.71 cfs @ 12.09 hrs, Volume= 2,239 cf, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
4,541	98	Paved parking, HSG A
5,457	39	>75% Grass cover, Good, HSG A
9,998	66	Weighted Average
5,457		54.58% Pervious Area
4,541		45.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-1: Captured to Mill St



Summary for Subcatchment P-2: Flow to Northeasterly Abutters

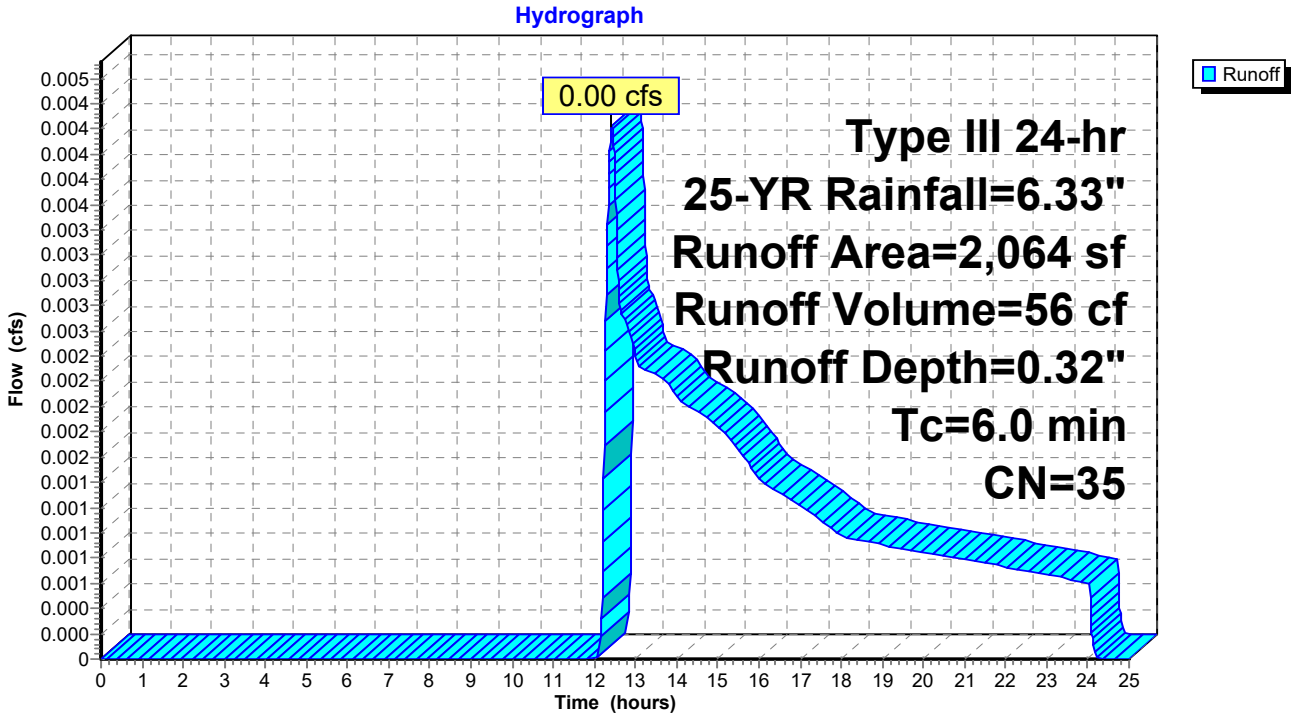
Runoff = 0.00 cfs @ 12.42 hrs, Volume= 56 cf, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,033	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
1,031	30	Woods, Good, HSG A
2,064	35	Weighted Average
2,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-2: Flow to Northeasterly Abutters



Summary for Subcatchment P-3: Uncaptured to Easterly Abutters

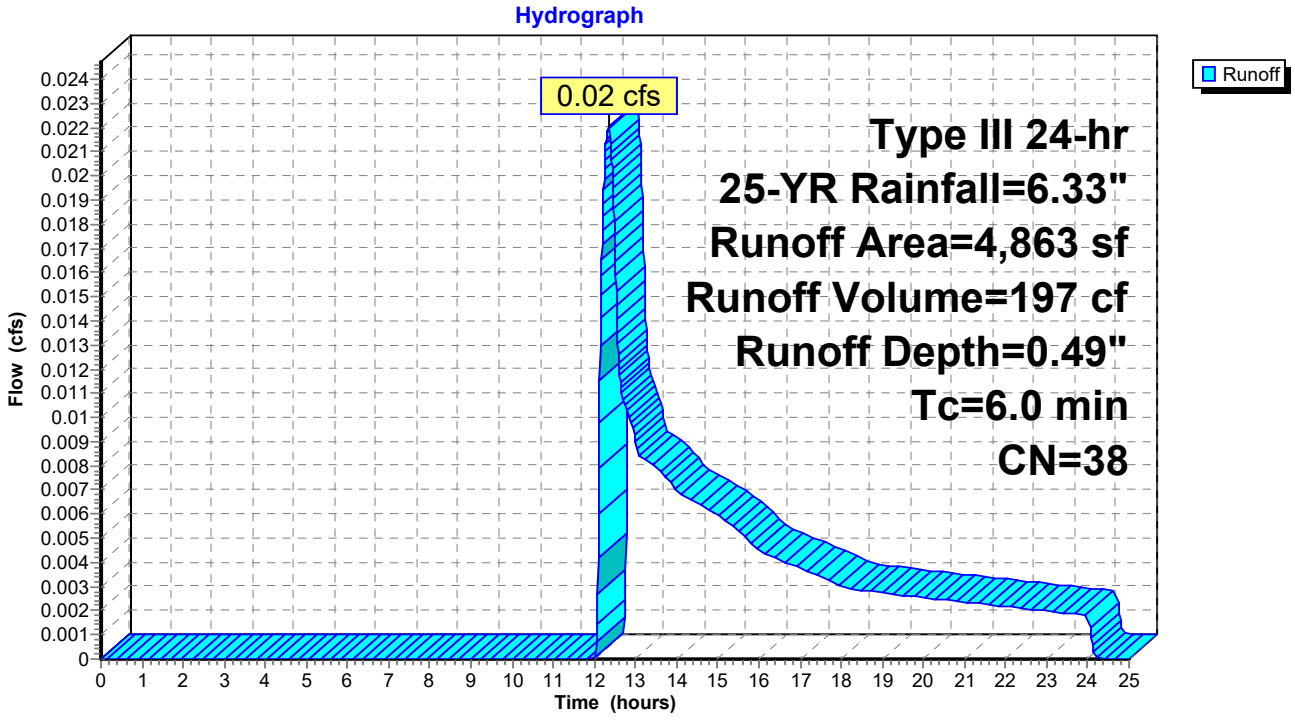
Runoff = 0.02 cfs @ 12.34 hrs, Volume= 197 cf, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
4,429	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
434	30	Woods, Good, HSG A
4,863	38	Weighted Average
4,863		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-3: Uncaptured to Easterly Abutters



Summary for Subcatchment P-4: Flow to Basin 1

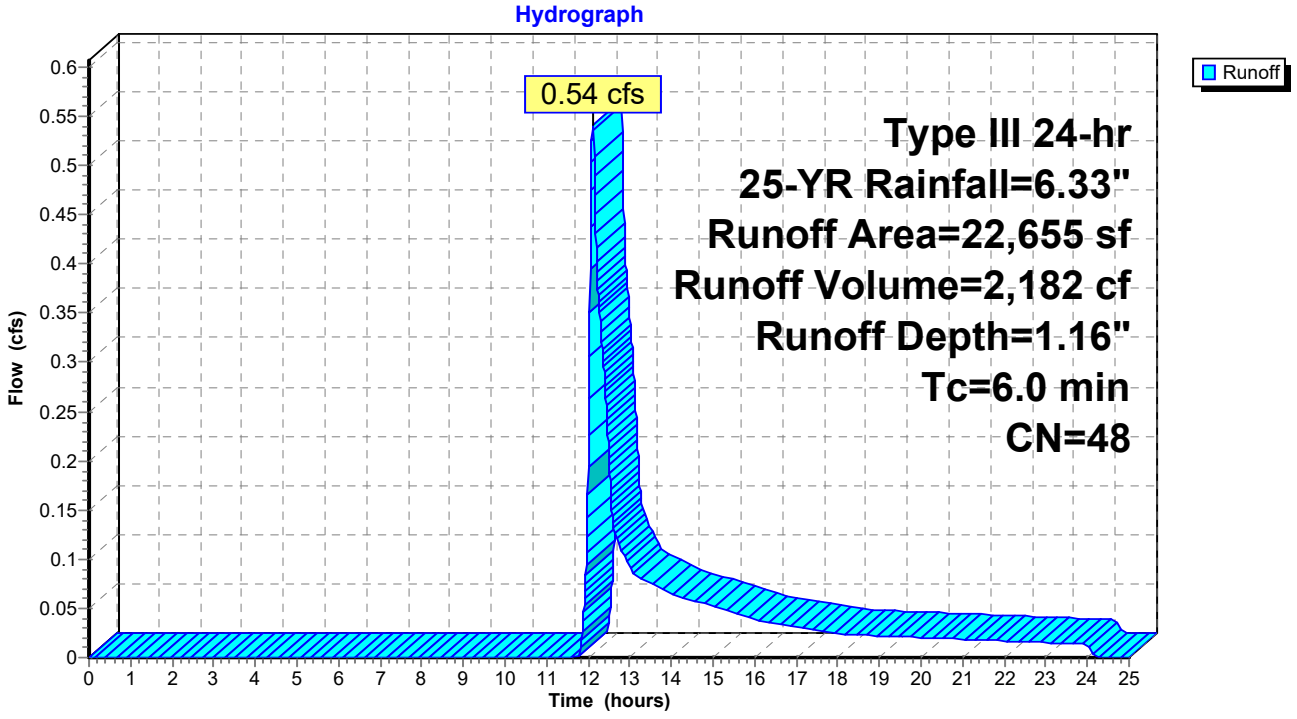
Runoff = 0.54 cfs @ 12.11 hrs, Volume= 2,182 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
17,923	39	>75% Grass cover, Good, HSG A
0	98	Paved parking, HSG A
972	30	Woods, Good, HSG A
22,655	48	Weighted Average
18,895		83.40% Pervious Area
3,760		16.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-4: Flow to Basin 1



Summary for Subcatchment P-5: Flow to CB 5

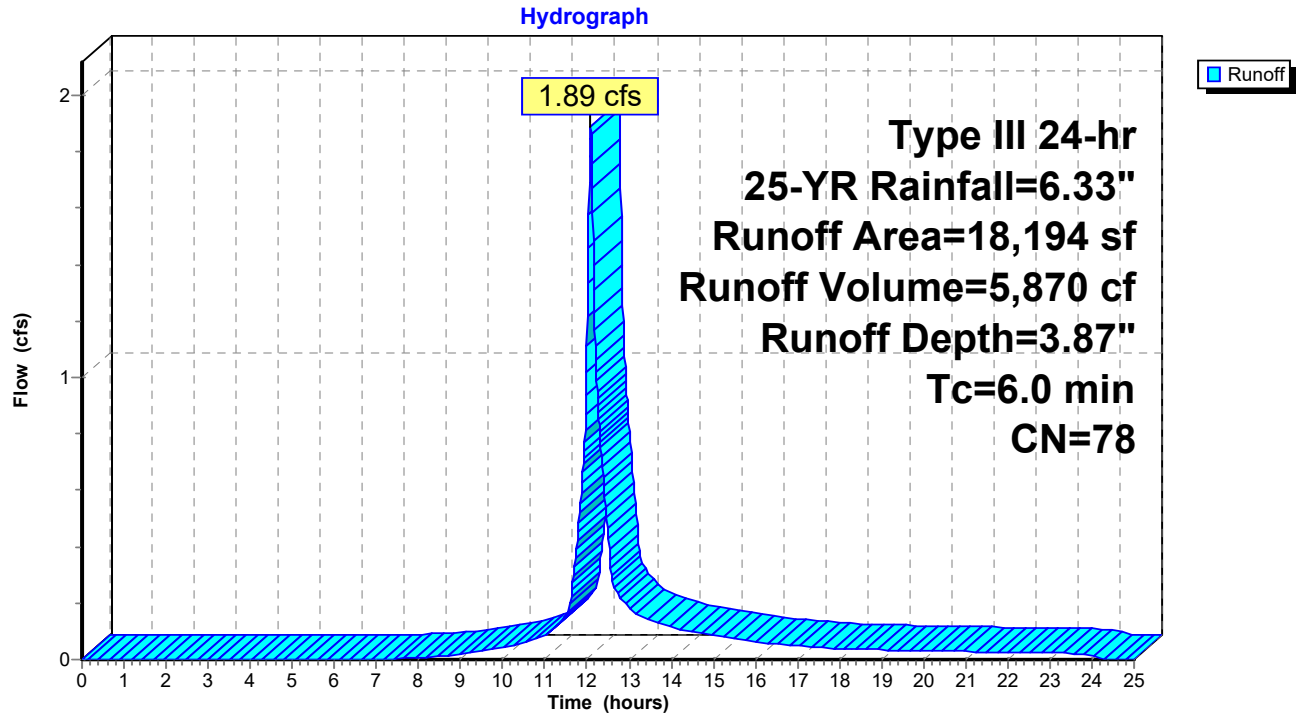
Runoff = 1.89 cfs @ 12.09 hrs, Volume= 5,870 cf, Depth= 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
11,917	98	Paved parking, HSG A
6,277	39	>75% Grass cover, Good, HSG A
18,194	78	Weighted Average
6,277		34.50% Pervious Area
11,917		65.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-5: Flow to CB 5



Summary for Subcatchment P-6: Captured to CB 3&4

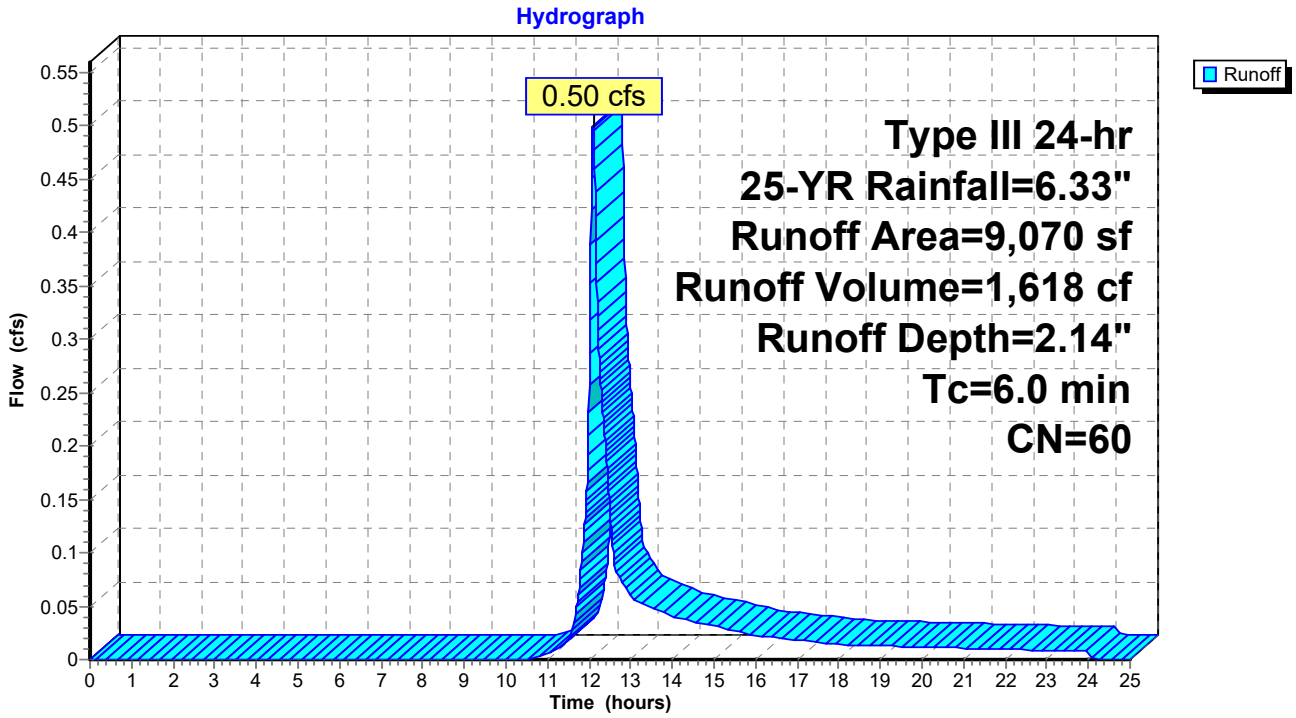
Runoff = 0.50 cfs @ 12.10 hrs, Volume= 1,618 cf, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
3,210	98	Paved parking, HSG A
5,860	39	>75% Grass cover, Good, HSG A
9,070	60	Weighted Average
5,860		64.61% Pervious Area
3,210		35.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-6: Captured to CB 3&4



Summary for Subcatchment P-7: Flow to Basin 2

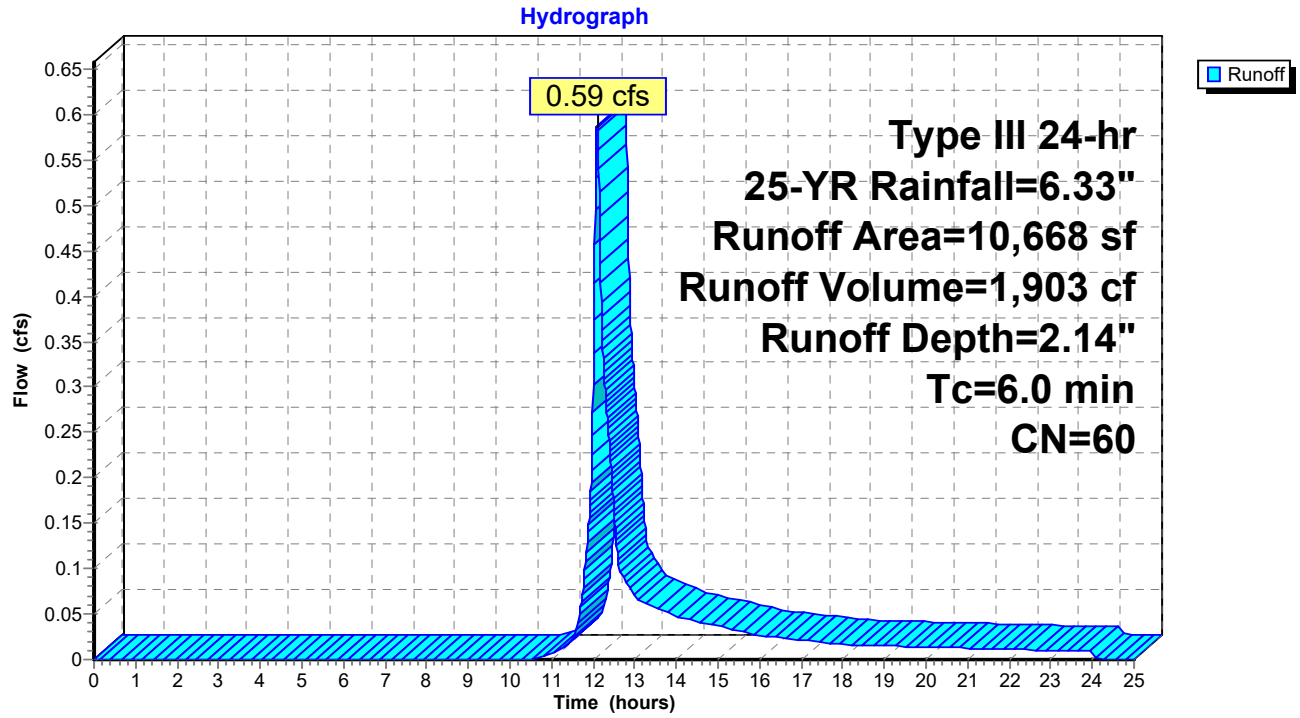
Runoff = 0.59 cfs @ 12.10 hrs, Volume= 1,903 cf, Depth= 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR Rainfall=6.33"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
6,908	39	>75% Grass cover, Good, HSG A
10,668	60	Weighted Average
6,908		64.75% Pervious Area
3,760		35.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-7: Flow to Basin 2

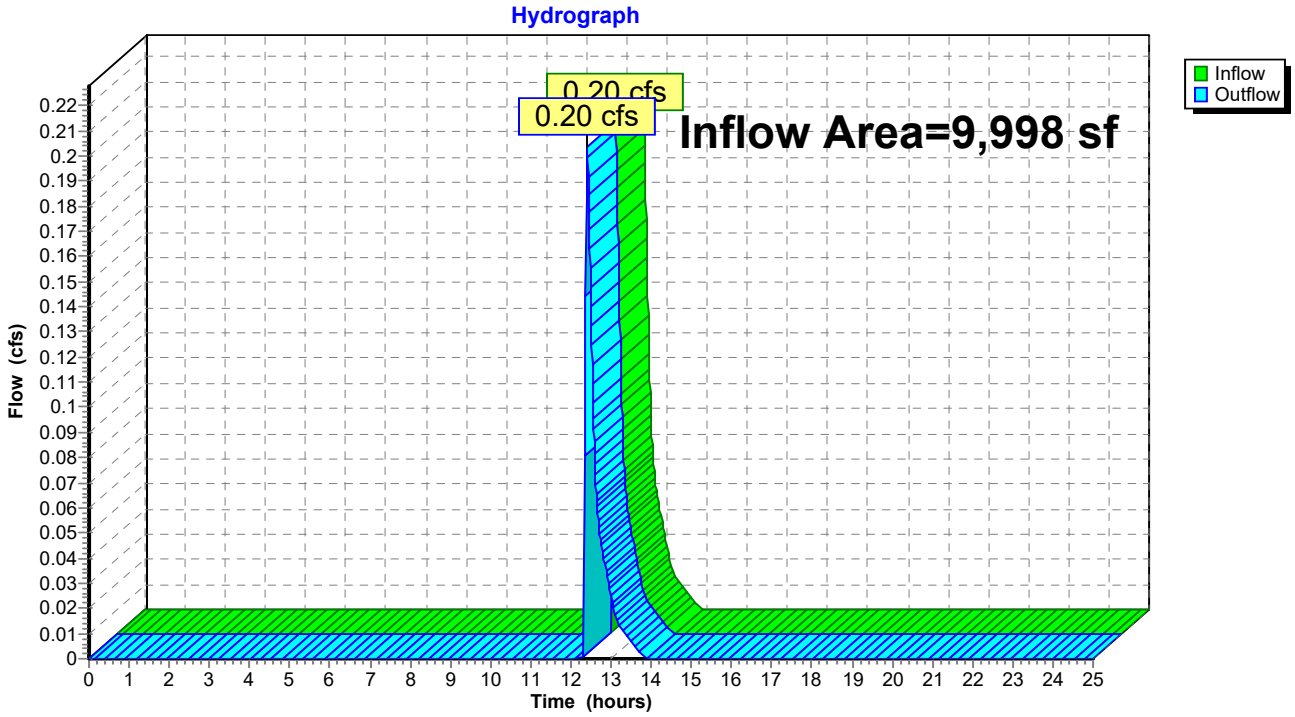


Summary for Reach 1R: Flow to Mill St

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 0.26" for 25-YR event
Inflow = 0.20 cfs @ 12.40 hrs, Volume= 218 cf
Outflow = 0.20 cfs @ 12.40 hrs, Volume= 218 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 1R: Flow to Mill St

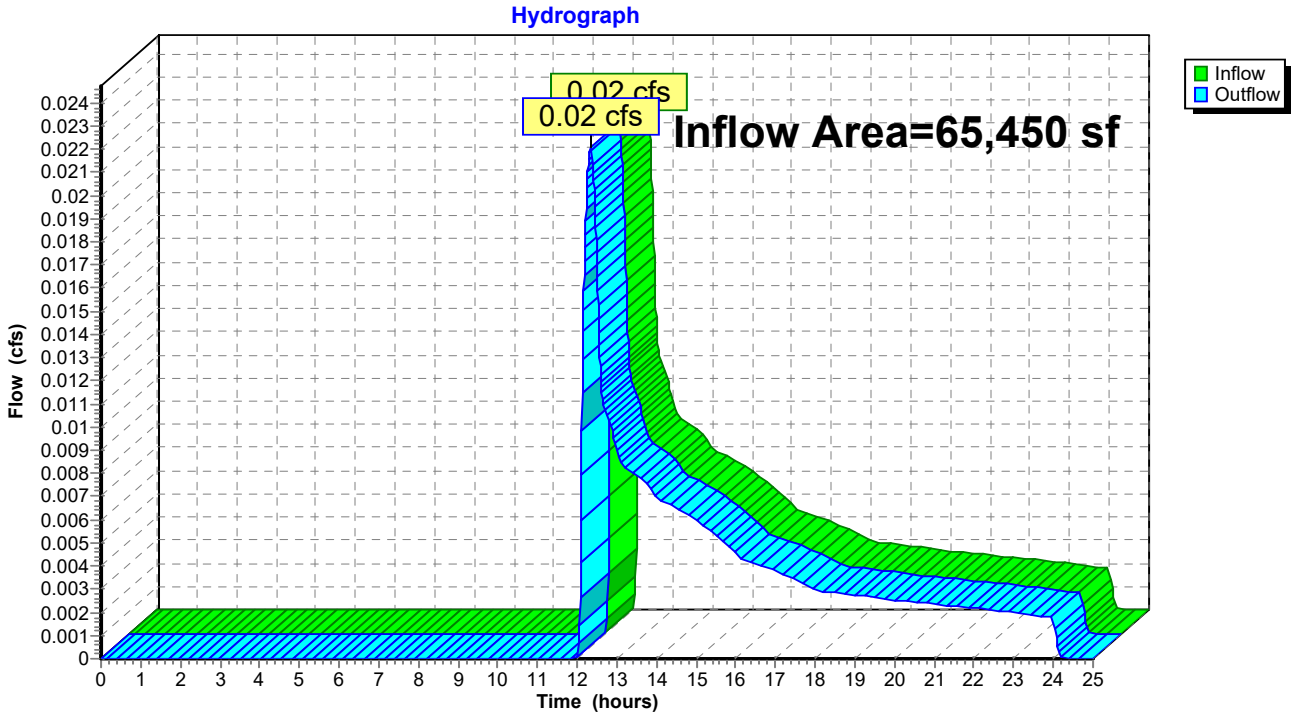


Summary for Reach 3R: Flow To Easterly Abutters

Inflow Area = 65,450 sf, 34.60% Impervious, Inflow Depth = 0.04" for 25-YR event
Inflow = 0.02 cfs @ 12.34 hrs, Volume= 197 cf
Outflow = 0.02 cfs @ 12.34 hrs, Volume= 197 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 3R: Flow To Easterly Abutters



Summary for Pond 1P: UG System 1

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 2.69" for 25-YR event
Inflow = 0.71 cfs @ 12.09 hrs, Volume= 2,239 cf
Outflow = 0.26 cfs @ 12.40 hrs, Volume= 2,239 cf, Atten= 64%, Lag= 18.6 min
Discarded = 0.06 cfs @ 11.64 hrs, Volume= 2,021 cf
Primary = 0.20 cfs @ 12.40 hrs, Volume= 218 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 126.60' @ 12.40 hrs Surf.Area= 293 sf Storage= 715 cf

Plug-Flow detention time= 107.3 min calculated for 2,238 cf (100% of inflow)
Center-of-Mass det. time= 107.2 min (952.1 - 844.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	122.00'	292 cf	**7.50'W x 39.00'L x 5.25'H Field A** 1,536 cf Overall - 561 cf Embedded = 975 cf x 30.0% Voids
#2A	123.00'	417 cf	**Shea Leaching Chamber 4x4x4** x 9 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	123.34'	5 cf	**10.0" Round Pipe Storage**-Impervious L= 9.3' S= 0.0050 '/'
#4	123.39'	11 cf	**10.0" Round Pipe Storage**-Impervious L= 20.1' S= 0.0050 '/'
#5	123.50'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**-Impervious
#6	126.50'	22 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) -Impervious
		785 cf	Total Available Storage

Storage Group A created with Chamber Wizard

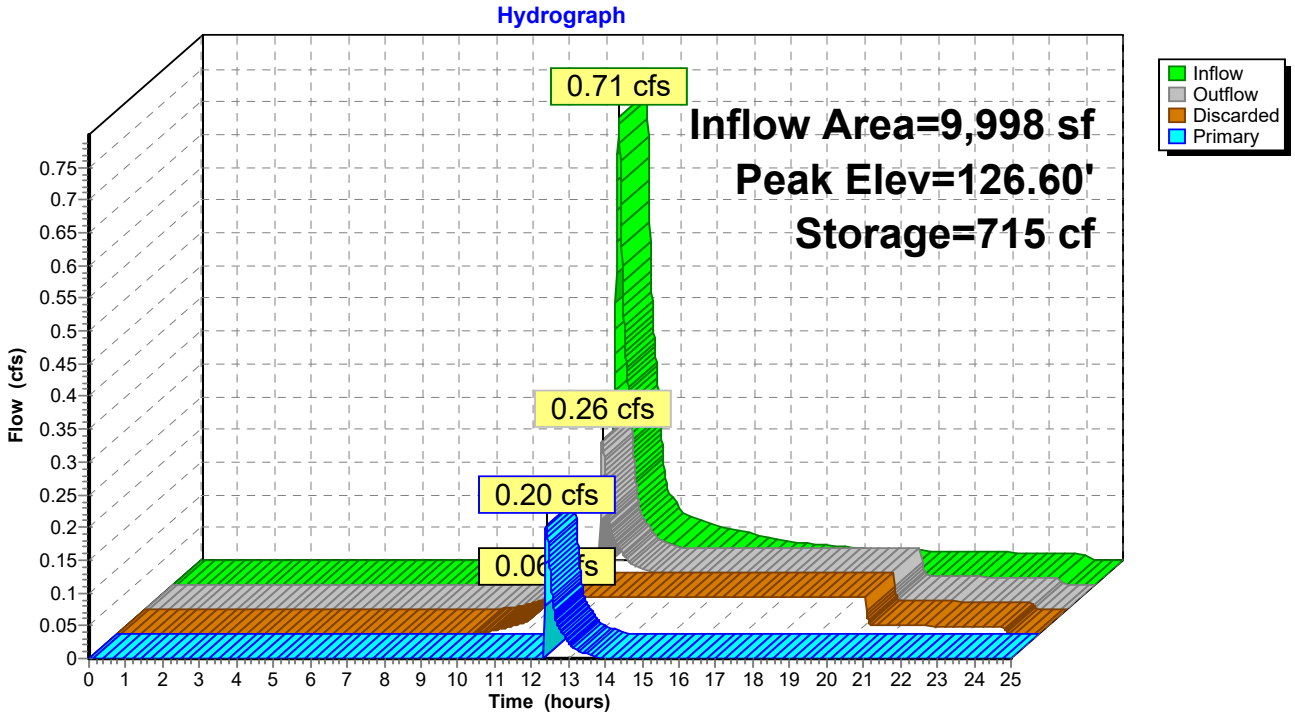
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.50	4	0	0
128.00	25	22	22

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	126.50'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 11.64 hrs HW=122.06' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.20 cfs @ 12.40 hrs HW=126.60' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.20 cfs @ 1.03 fps)

Pond 1P: UG System 1



Summary for Pond 2P: UG System 2

Inflow Area = 9,070 sf, 35.39% Impervious, Inflow Depth = 2.14" for 25-YR event
Inflow = 0.50 cfs @ 12.10 hrs, Volume= 1,618 cf
Outflow = 0.20 cfs @ 12.39 hrs, Volume= 1,618 cf, Atten= 60%, Lag= 17.8 min
Discarded = 0.07 cfs @ 11.78 hrs, Volume= 1,479 cf
Primary = 0.13 cfs @ 12.39 hrs, Volume= 139 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 131.20' @ 12.39 hrs Surf.Area= 350 sf Storage= 398 cf

Plug-Flow detention time= 38.8 min calculated for 1,617 cf (100% of inflow)
Center-of-Mass det. time= 38.8 min (898.3 - 859.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.75'	327 cf	**17.50'W x 20.00'L x 5.25'H Field A** 1,838 cf Overall - 748 cf Embedded = 1,090 cf x 30.0% Voids
#2A	129.75'	557 cf	**Shea Leaching Chamber 4x4x4** x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf 12 Chambers in 3 Rows
		883 cf	Total Available Storage

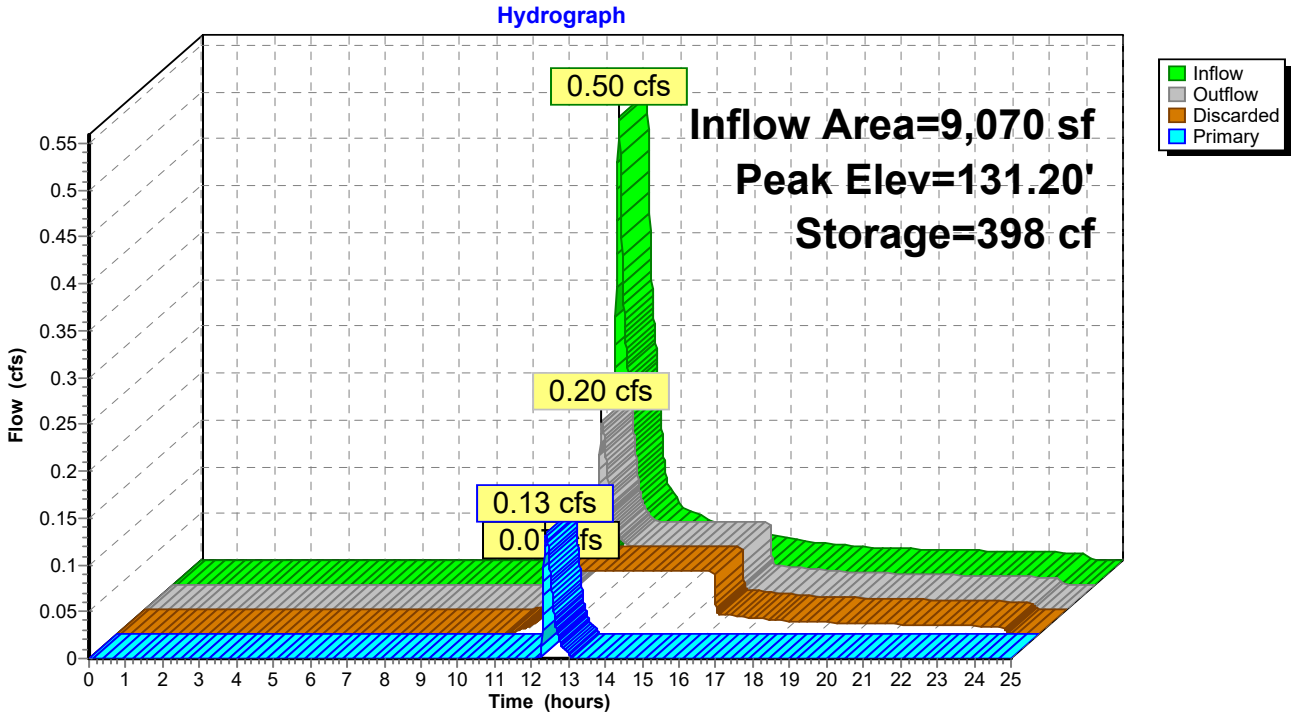
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	128.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.00'	**12.0" Round Culvert** L= 84.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.00' / 126.00' S= 0.0594 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.07 cfs @ 11.78 hrs HW=128.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.13 cfs @ 12.39 hrs HW=131.20' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.13 cfs @ 1.19 fps)

Pond 2P: UG System 2



Summary for Pond 3P: UG System 3

Inflow Area = 18,194 sf, 65.50% Impervious, Inflow Depth = 3.87" for 25-YR event
Inflow = 1.89 cfs @ 12.09 hrs, Volume= 5,870 cf
Outflow = 0.64 cfs @ 12.39 hrs, Volume= 5,870 cf, Atten= 66%, Lag= 18.1 min
Discarded = 0.21 cfs @ 11.63 hrs, Volume= 5,247 cf
Primary = 0.44 cfs @ 12.39 hrs, Volume= 623 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 131.90' @ 12.39 hrs Surf.Area= 1,072 sf Storage= 1,660 cf

Plug-Flow detention time= 47.7 min calculated for 5,868 cf (100% of inflow)
Center-of-Mass det. time= 47.7 min (864.6 - 816.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	835 cf	**15.76'W x 68.00'L x 4.50'H Field A** 4,823 cf Overall - 2,039 cf Embedded = 2,784 cf x 30.0% Voids
#2A	130.00'	1,464 cf	**Shea Leaching Chamber 4x4x3** x 48 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 48 Chambers in 3 Rows
		2,299 cf	Total Available Storage

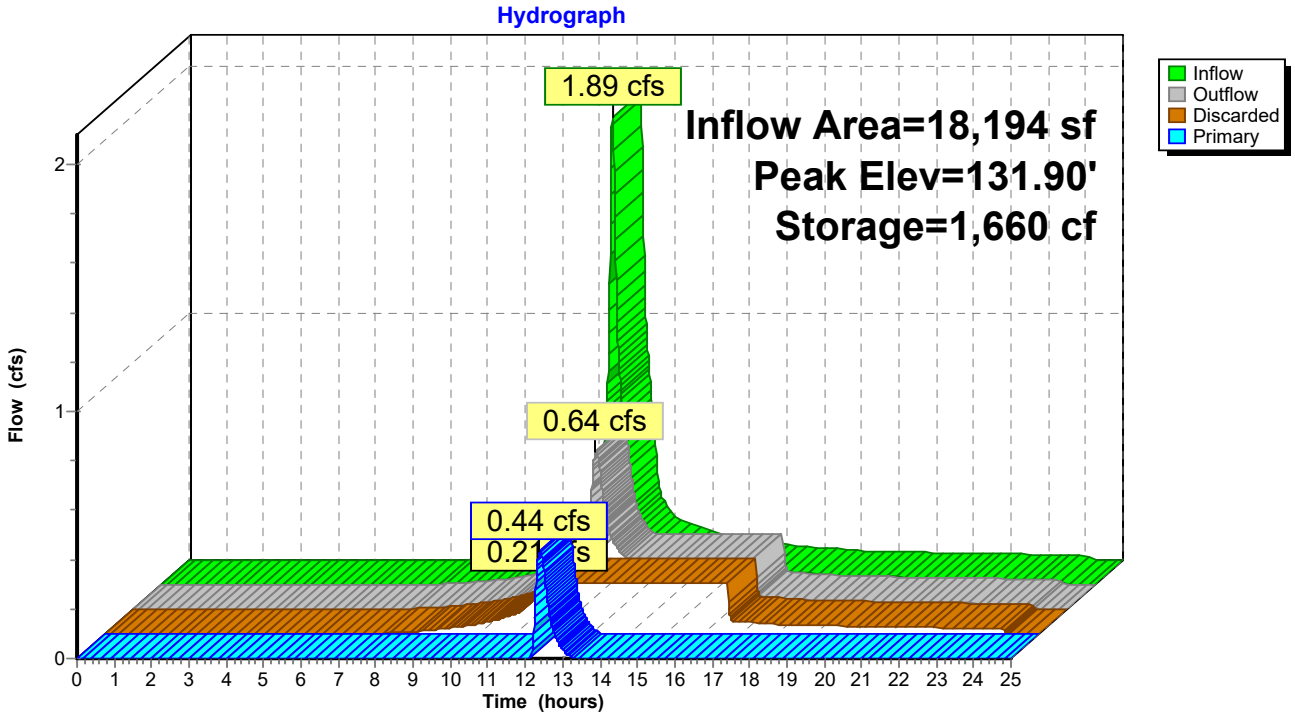
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	129.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.50'	**10.0" Round Culvert** L= 56.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.50' / 128.00' S= 0.0619 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.21 cfs @ 11.63 hrs HW=129.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.43 cfs @ 12.39 hrs HW=131.90' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.43 cfs @ 1.69 fps)

Pond 3P: UG System 3



Summary for Pond 4P: Basin 1

Inflow Area = 40,849 sf, 38.38% Impervious, Inflow Depth = 0.82" for 25-YR event
Inflow = 0.73 cfs @ 12.36 hrs, Volume= 2,805 cf
Outflow = 0.27 cfs @ 12.69 hrs, Volume= 2,805 cf, Atten= 63%, Lag= 19.5 min
Discarded = 0.27 cfs @ 12.69 hrs, Volume= 2,805 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 126.60' @ 12.69 hrs Surf.Area= 1,399 sf Storage= 704 cf

Plug-Flow detention time= 18.4 min calculated for 2,804 cf (100% of inflow)
Center-of-Mass det. time= 18.4 min (882.9 - 864.5)

Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	3,407 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

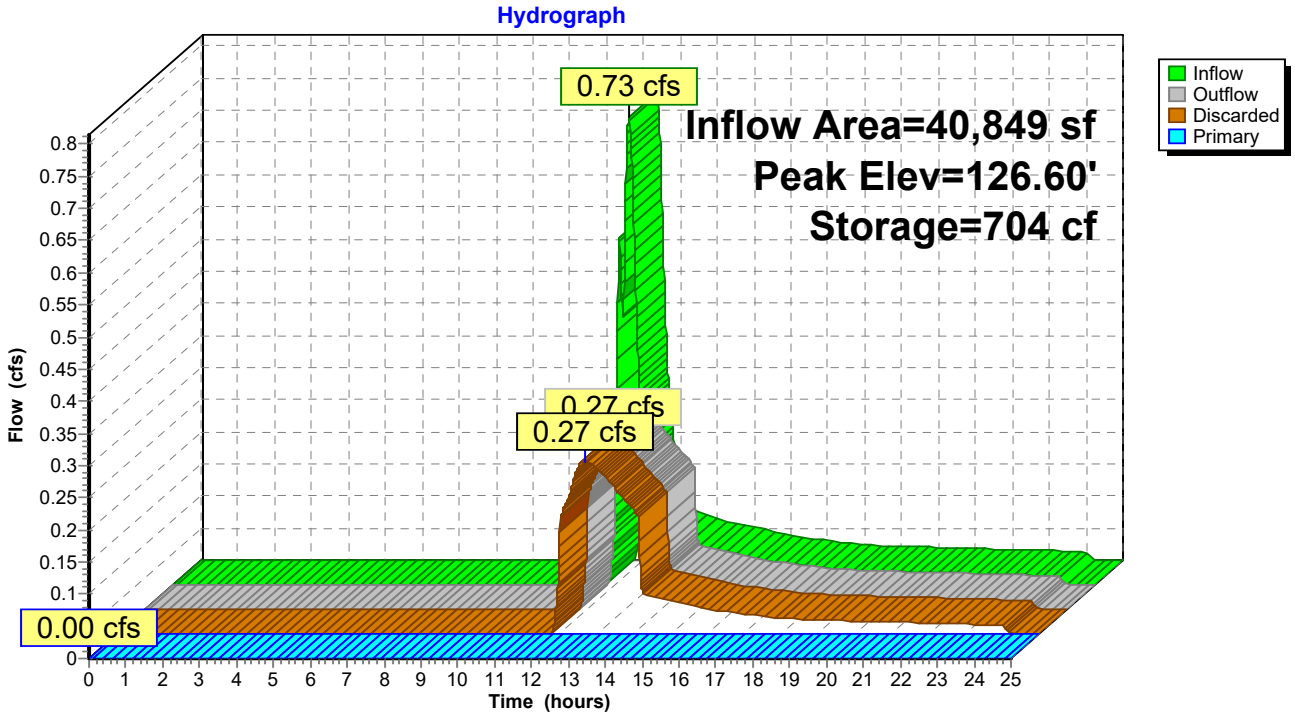
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.00	940	0	0
128.00	2,467	3,407	3,407

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	127.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.27 cfs @ 12.69 hrs HW=126.60' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=126.00' (Free Discharge)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 4P: Basin 1



Summary for Pond 5P: Basin 2

Inflow Area = 19,738 sf, 35.31% Impervious, Inflow Depth = 1.24" for 25-YR event
Inflow = 0.59 cfs @ 12.10 hrs, Volume= 2,042 cf
Outflow = 0.17 cfs @ 12.59 hrs, Volume= 2,042 cf, Atten= 72%, Lag= 29.6 min
Discarded = 0.17 cfs @ 12.59 hrs, Volume= 2,042 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 124.76' @ 12.59 hrs Surf.Area= 873 sf Storage= 527 cf

Plug-Flow detention time= 22.7 min calculated for 2,042 cf (100% of inflow)
Center-of-Mass det. time= 22.7 min (874.7 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,971 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

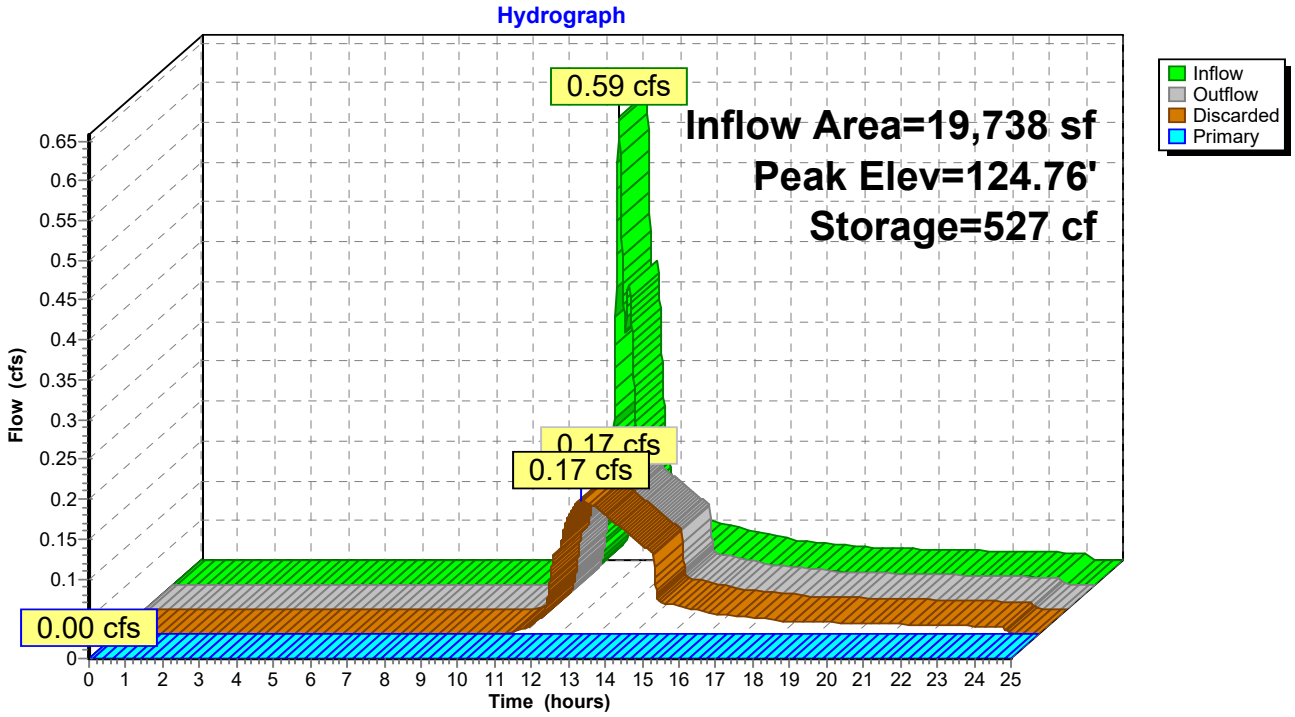
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.00	506	0	0
126.00	1,465	1,971	1,971

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	125.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.17 cfs @ 12.59 hrs HW=124.76' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=124.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 5P: Basin 2



Summary for Subcatchment P-1: Captured to Mill St

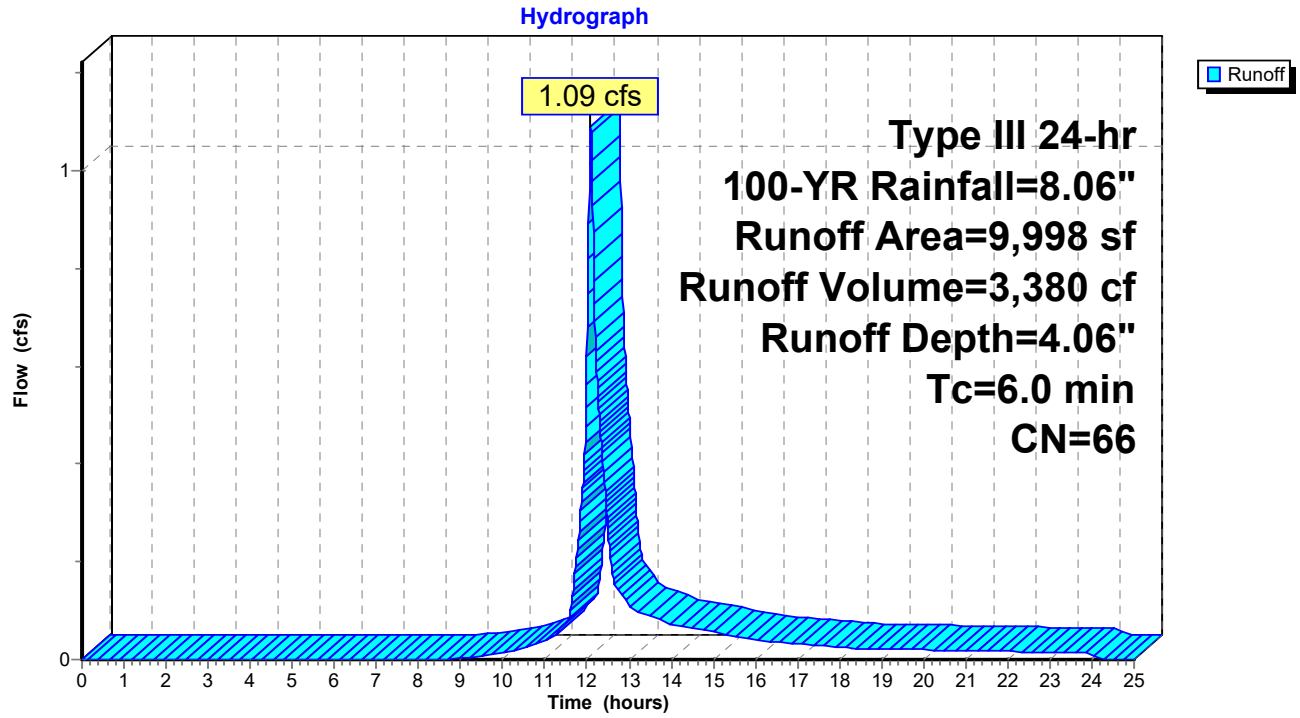
Runoff = 1.09 cfs @ 12.09 hrs, Volume= 3,380 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
4,541	98	Paved parking, HSG A
5,457	39	>75% Grass cover, Good, HSG A
9,998	66	Weighted Average
5,457		54.58% Pervious Area
4,541		45.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-1: Captured to Mill St



Summary for Subcatchment P-2: Flow to Northeasterly Abutters

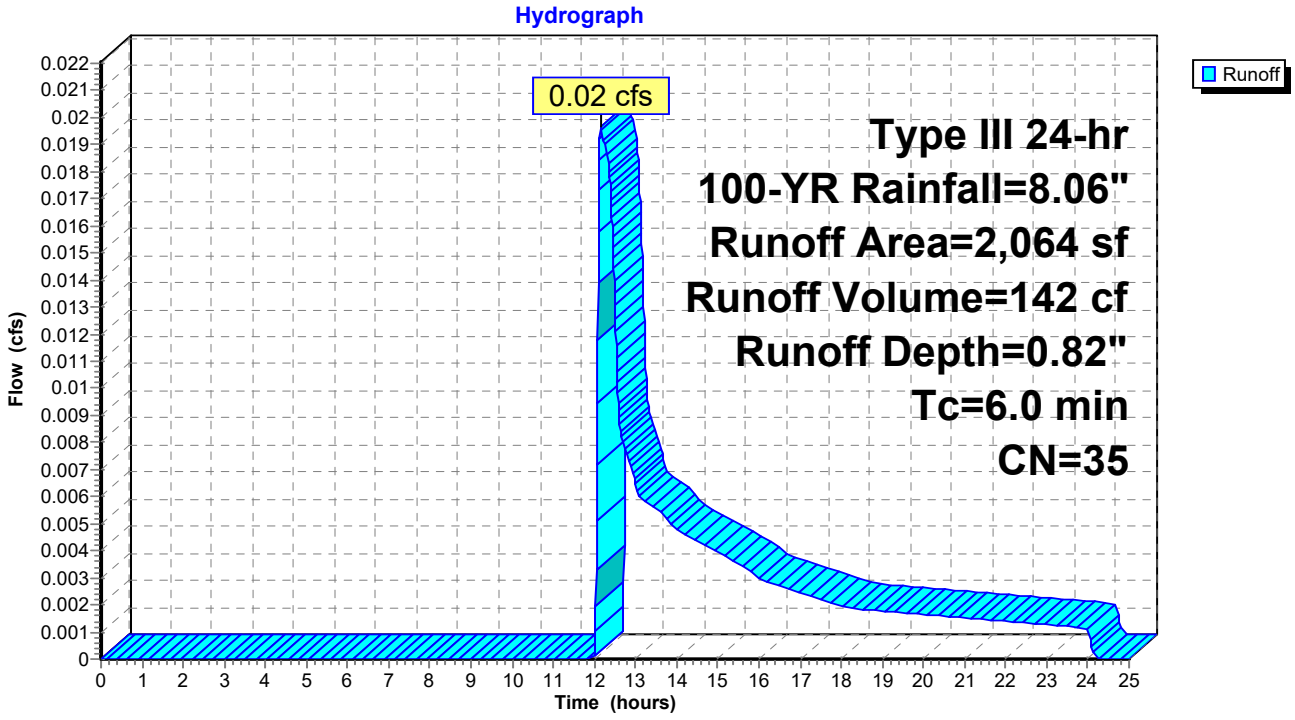
Runoff = 0.02 cfs @ 12.15 hrs, Volume= 142 cf, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
1,033	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
1,031	30	Woods, Good, HSG A
2,064	35	Weighted Average
2,064		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-2: Flow to Northeasterly Abutters



Summary for Subcatchment P-3: Uncaptured to Easterly Abutters

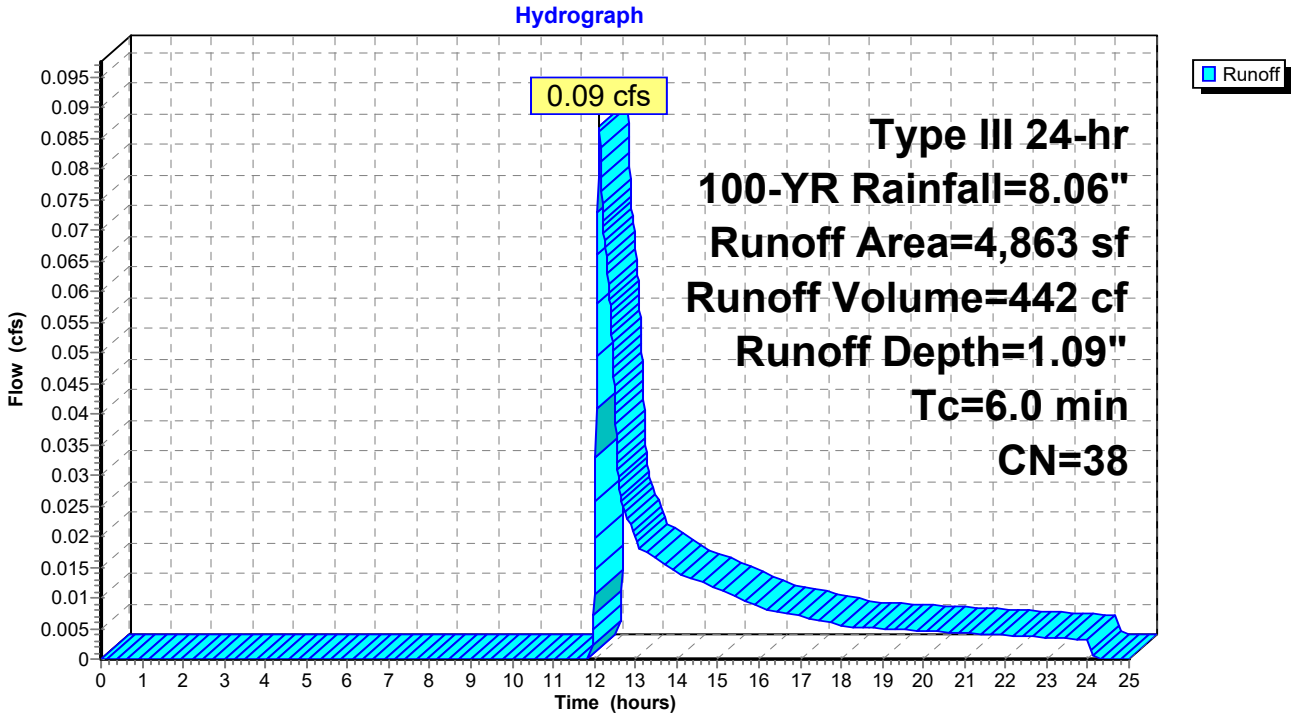
Runoff = 0.09 cfs @ 12.12 hrs, Volume= 442 cf, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
4,429	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
434	30	Woods, Good, HSG A
4,863	38	Weighted Average
4,863		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-3: Uncaptured to Easterly Abutters



Summary for Subcatchment P-4: Flow to Basin 1

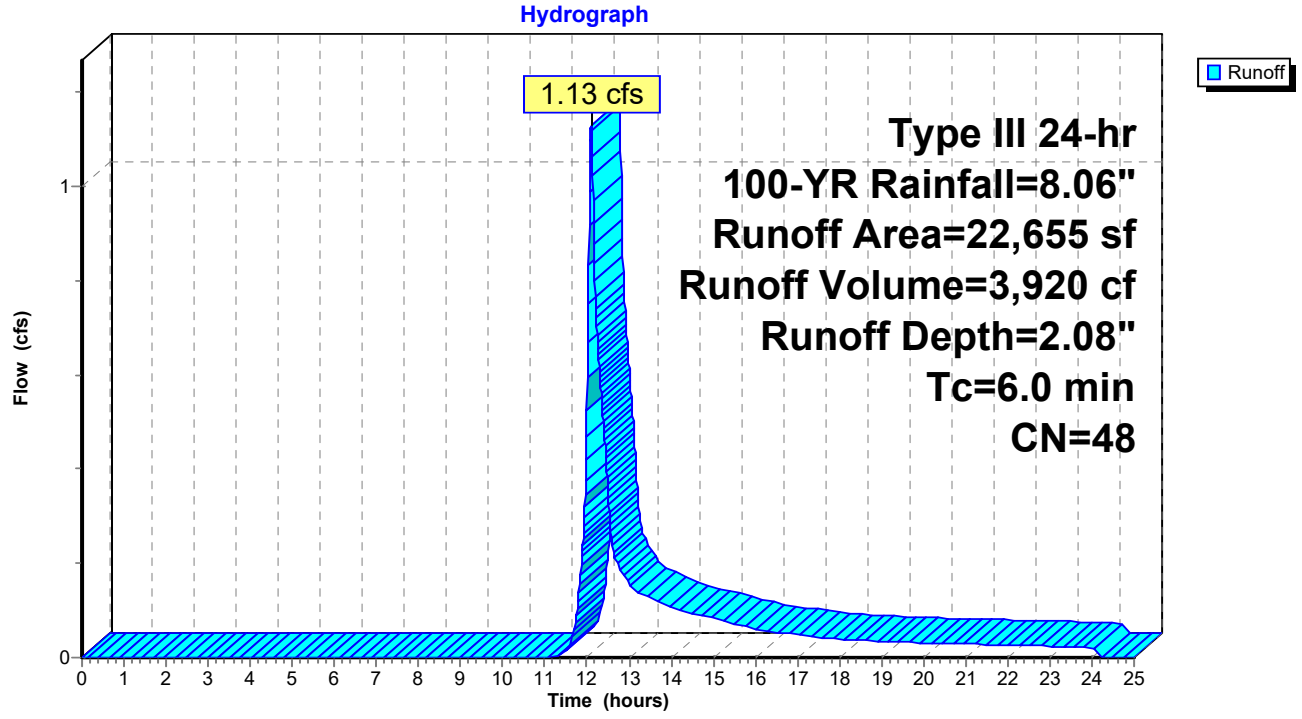
Runoff = 1.13 cfs @ 12.10 hrs, Volume= 3,920 cf, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
17,923	39	>75% Grass cover, Good, HSG A
0	98	Paved parking, HSG A
972	30	Woods, Good, HSG A
22,655	48	Weighted Average
18,895		83.40% Pervious Area
3,760		16.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-4: Flow to Basin 1



Summary for Subcatchment P-5: Flow to CB 5

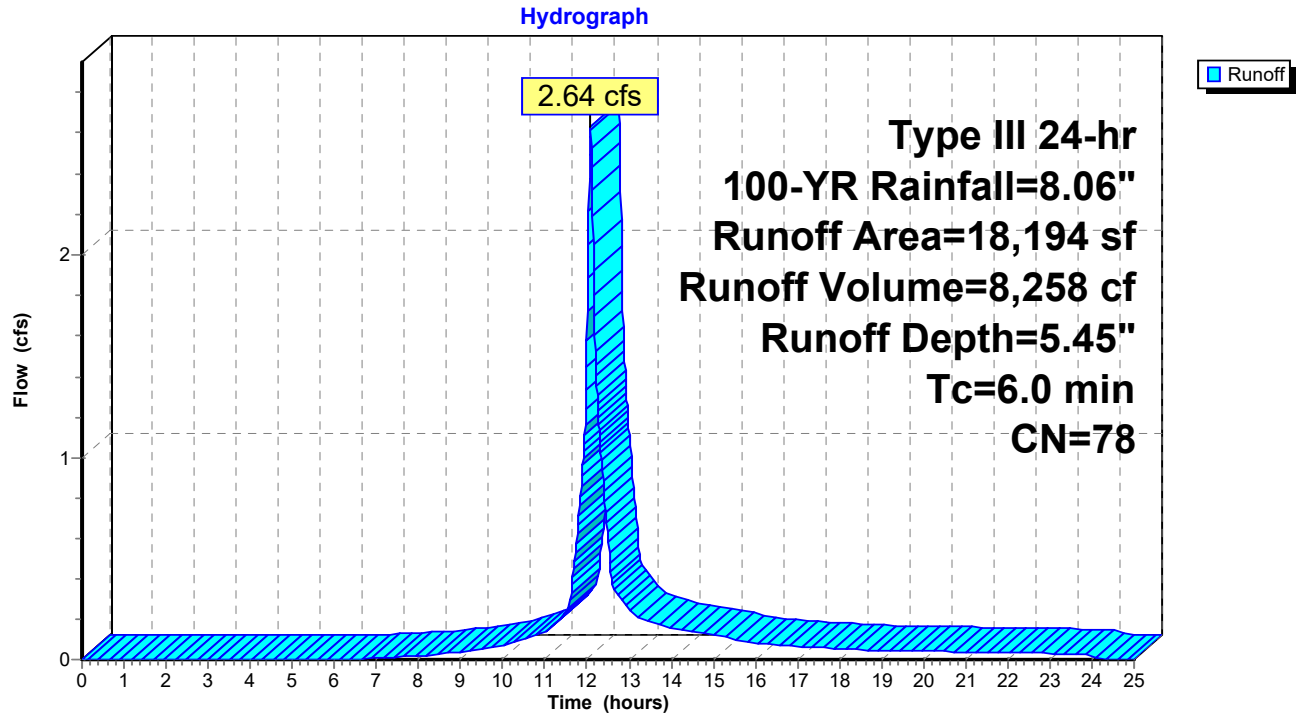
Runoff = 2.64 cfs @ 12.09 hrs, Volume= 8,258 cf, Depth= 5.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
11,917	98	Paved parking, HSG A
6,277	39	>75% Grass cover, Good, HSG A
18,194	78	Weighted Average
6,277		34.50% Pervious Area
11,917		65.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-5: Flow to CB 5



Summary for Subcatchment P-6: Captured to CB 3&4

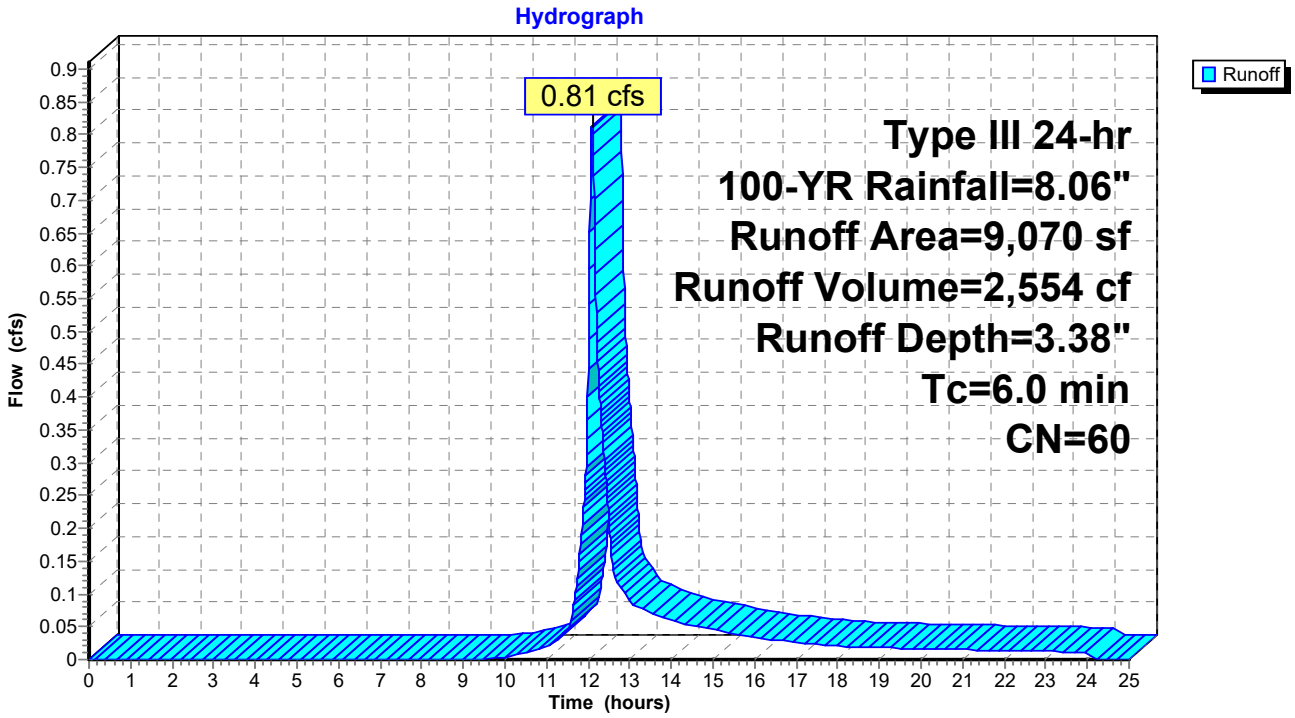
Runoff = 0.81 cfs @ 12.09 hrs, Volume= 2,554 cf, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
3,210	98	Paved parking, HSG A
5,860	39	>75% Grass cover, Good, HSG A
9,070	60	Weighted Average
5,860		64.61% Pervious Area
3,210		35.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-6: Captured to CB 3&4



Summary for Subcatchment P-7: Flow to Basin 2

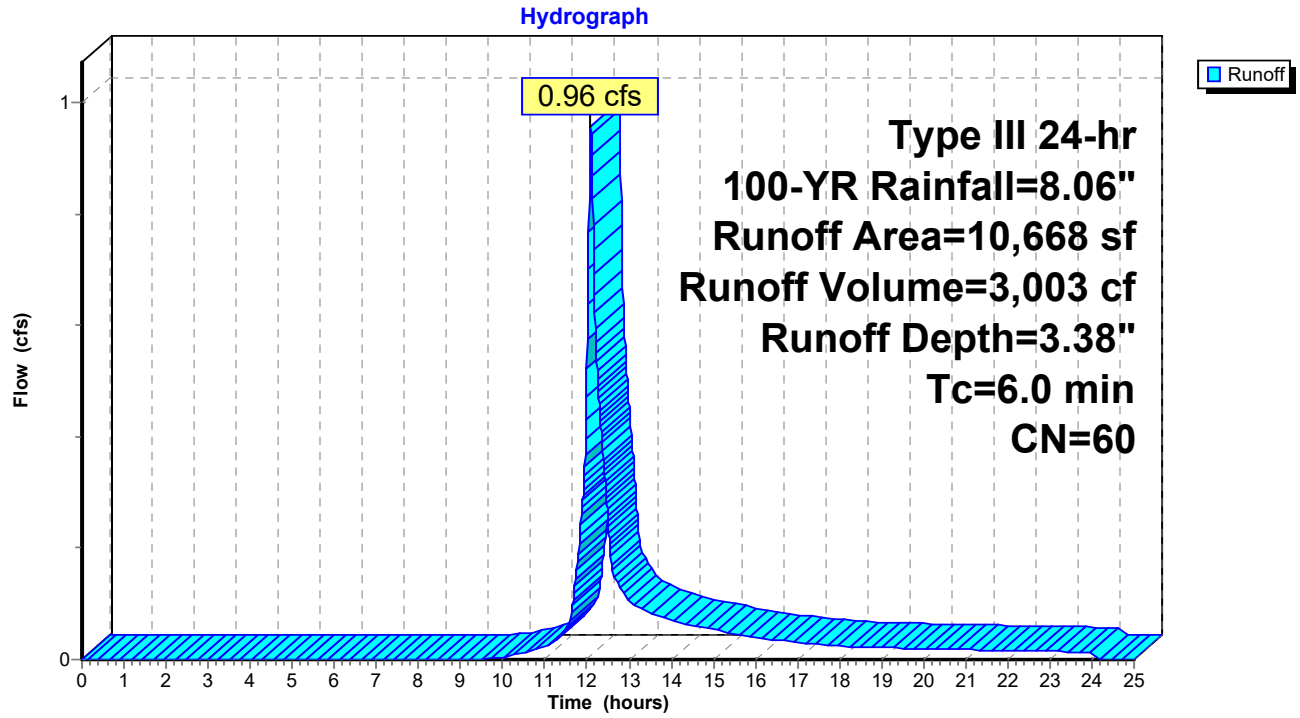
Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,003 cf, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-YR Rainfall=8.06"

Area (sf)	CN	Description
3,760	98	Roofs, HSG A
6,908	39	>75% Grass cover, Good, HSG A
10,668	60	Weighted Average
6,908		64.75% Pervious Area
3,760		35.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment P-7: Flow to Basin 2

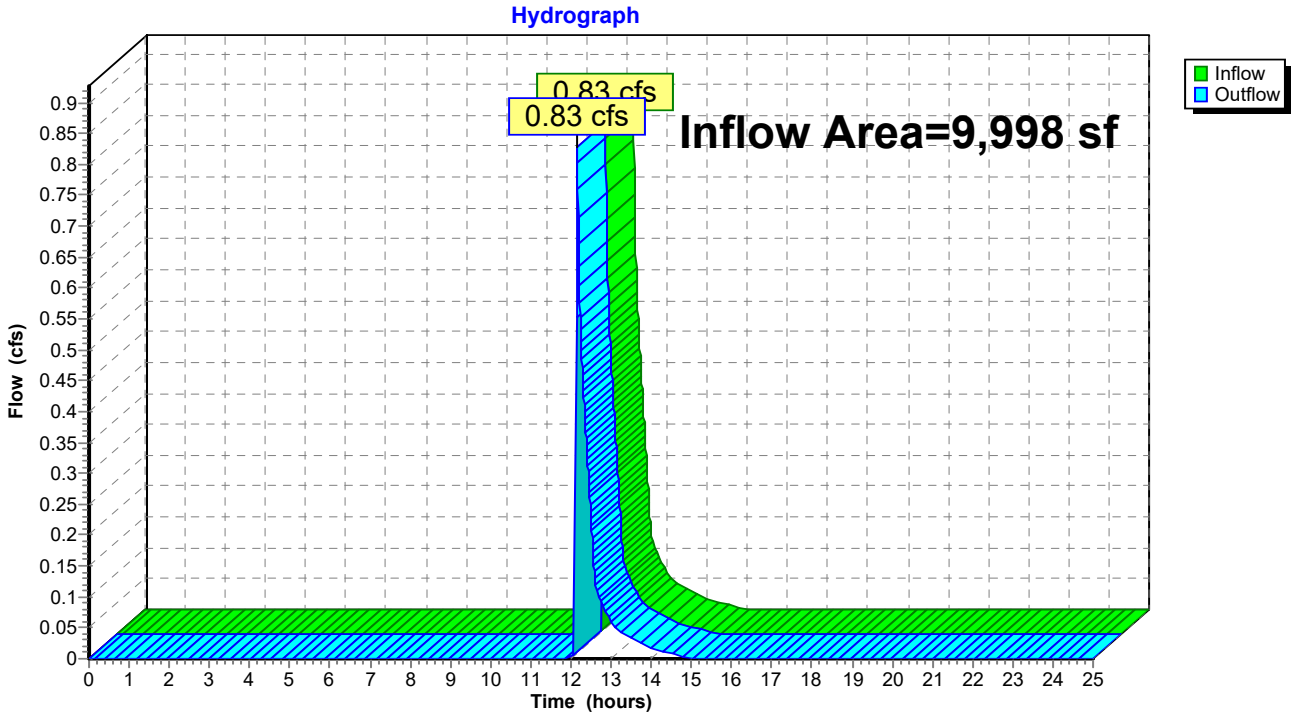


Summary for Reach 1R: Flow to Mill St

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 1.16" for 100-YR event
Inflow = 0.83 cfs @ 12.15 hrs, Volume= 969 cf
Outflow = 0.83 cfs @ 12.15 hrs, Volume= 969 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 1R: Flow to Mill St

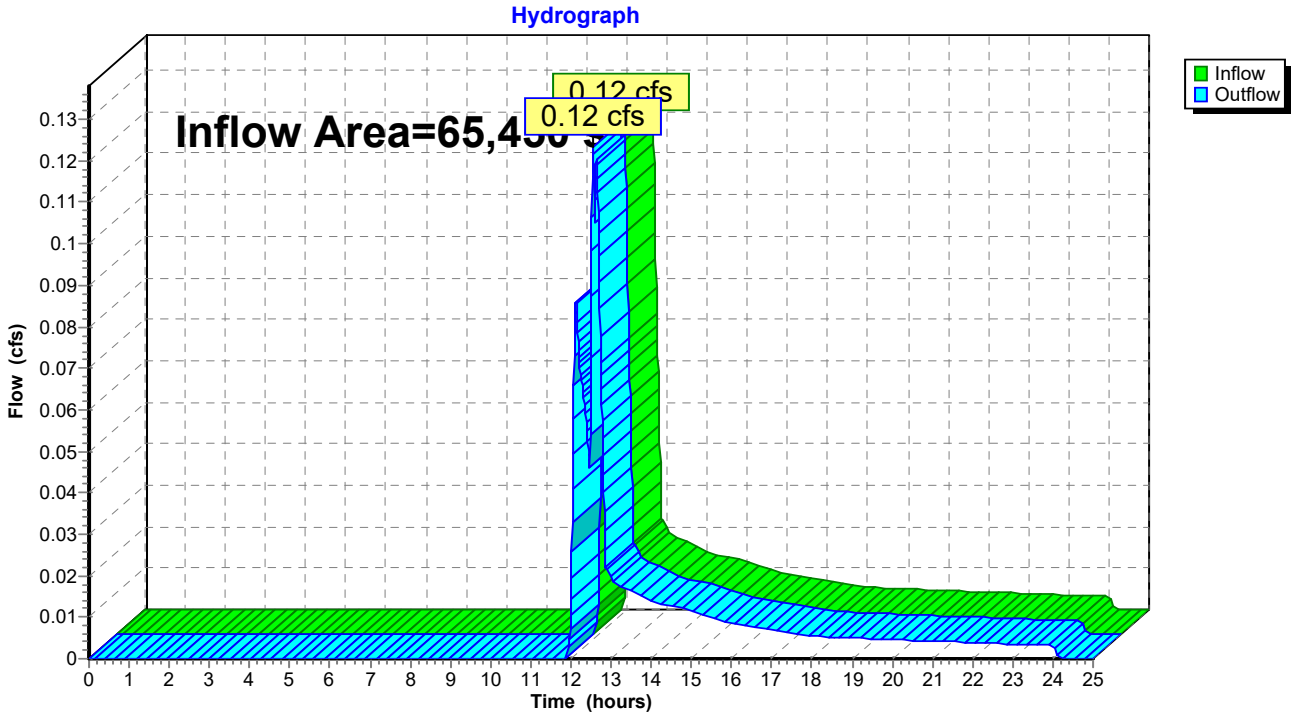


Summary for Reach 3R: Flow To Easterly Abutters

Inflow Area = 65,450 sf, 34.60% Impervious, Inflow Depth = 0.10" for 100-YR event
Inflow = 0.12 cfs @ 12.55 hrs, Volume= 523 cf
Outflow = 0.12 cfs @ 12.55 hrs, Volume= 523 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 3R: Flow To Easterly Abutters



Summary for Pond 1P: UG System 1

Inflow Area = 9,998 sf, 45.42% Impervious, Inflow Depth = 4.06" for 100-YR event
Inflow = 1.09 cfs @ 12.09 hrs, Volume= 3,380 cf
Outflow = 0.88 cfs @ 12.15 hrs, Volume= 3,380 cf, Atten= 19%, Lag= 3.7 min
Discarded = 0.06 cfs @ 11.33 hrs, Volume= 2,411 cf
Primary = 0.83 cfs @ 12.15 hrs, Volume= 969 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 126.75' @ 12.15 hrs Surf.Area= 293 sf Storage= 740 cf

Plug-Flow detention time= 89.2 min calculated for 3,379 cf (100% of inflow)
Center-of-Mass det. time= 89.2 min (922.1 - 832.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	122.00'	292 cf	**7.50'W x 39.00'L x 5.25'H Field A** 1,536 cf Overall - 561 cf Embedded = 975 cf x 30.0% Voids
#2A	123.00'	417 cf	**Shea Leaching Chamber 4x4x4** x 9 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
#3	123.34'	5 cf	**10.0" Round Pipe Storage**-Impervious L= 9.3' S= 0.0050 '/'
#4	123.39'	11 cf	**10.0" Round Pipe Storage**-Impervious L= 20.1' S= 0.0050 '/'
#5	123.50'	38 cf	**4.00'D x 3.00'H Vertical Cone/Cylinder**-Impervious
#6	126.50'	22 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) -Impervious
		785 cf	Total Available Storage

Storage Group A created with Chamber Wizard

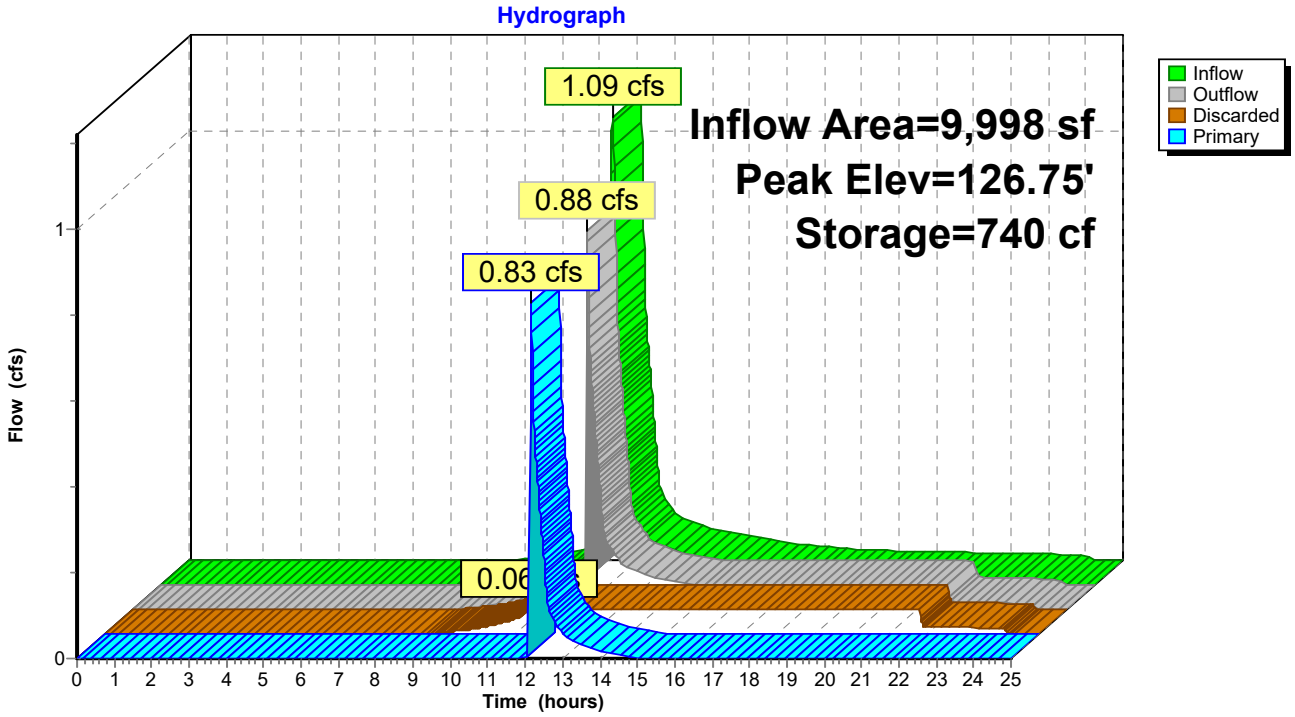
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.50	4	0	0
128.00	25	22	22

Device	Routing	Invert	Outlet Devices
#1	Discarded	122.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	126.50'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height

Discarded OutFlow Max=0.06 cfs @ 11.33 hrs HW=122.06' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.82 cfs @ 12.15 hrs HW=126.75' (Free Discharge)
↑**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.82 cfs @ 1.72 fps)

Pond 1P: UG System 1



Summary for Pond 2P: UG System 2

Inflow Area = 9,070 sf, 35.39% Impervious, Inflow Depth = 3.38" for 100-YR event
Inflow = 0.81 cfs @ 12.09 hrs, Volume= 2,554 cf
Outflow = 0.63 cfs @ 12.16 hrs, Volume= 2,554 cf, Atten= 23%, Lag= 4.0 min
Discarded = 0.07 cfs @ 11.65 hrs, Volume= 1,893 cf
Primary = 0.56 cfs @ 12.16 hrs, Volume= 660 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 131.43' @ 12.16 hrs Surf.Area= 350 sf Storage= 444 cf

Plug-Flow detention time= 35.9 min calculated for 2,552 cf (100% of inflow)
Center-of-Mass det. time= 35.9 min (881.7 - 845.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	128.75'	327 cf	**17.50'W x 20.00'L x 5.25'H Field A** 1,838 cf Overall - 748 cf Embedded = 1,090 cf x 30.0% Voids
#2A	129.75'	557 cf	**Shea Leaching Chamber 4x4x4** x 12 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf 12 Chambers in 3 Rows
		883 cf	Total Available Storage

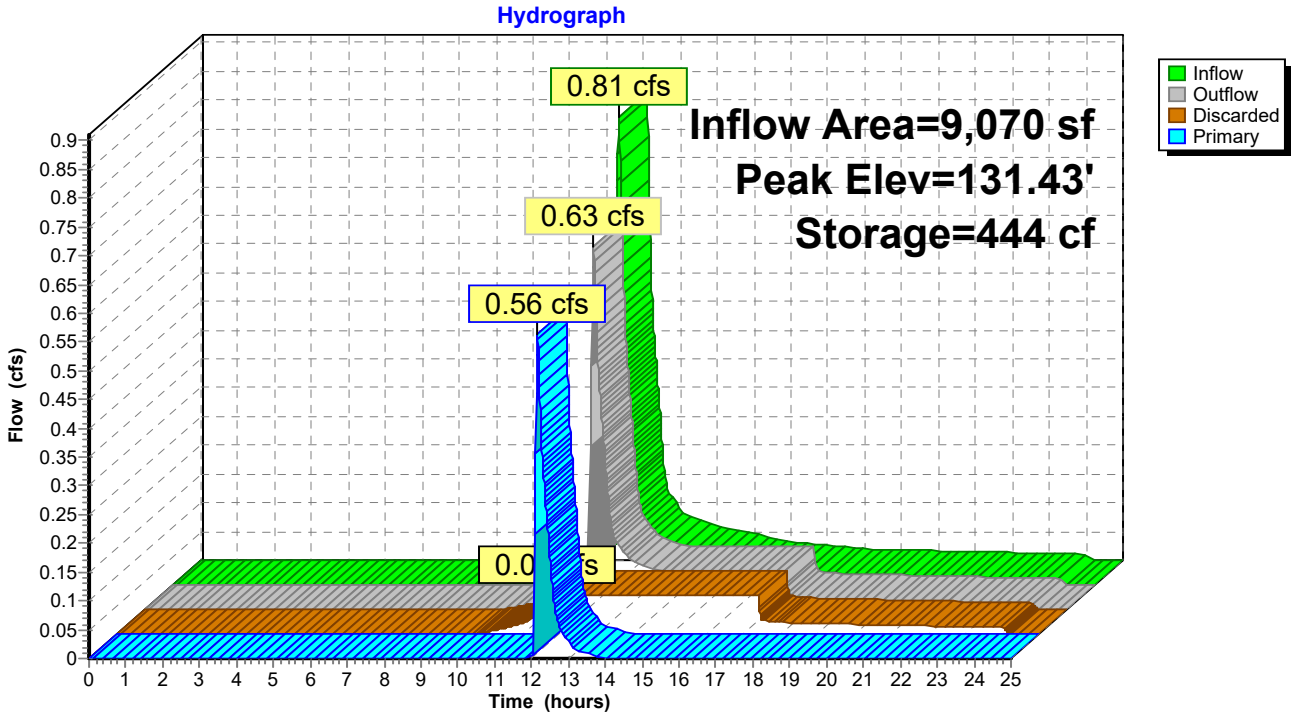
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	128.75'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.00'	**12.0" Round Culvert** L= 84.2' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.00' / 126.00' S= 0.0594 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.07 cfs @ 11.65 hrs HW=128.81' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.56 cfs @ 12.16 hrs HW=131.43' (Free Discharge)
↑**2=Culvert** (Inlet Controls 0.56 cfs @ 1.76 fps)

Pond 2P: UG System 2



Summary for Pond 3P: UG System 3

Inflow Area = 18,194 sf, 65.50% Impervious, Inflow Depth = 5.45" for 100-YR event
Inflow = 2.64 cfs @ 12.09 hrs, Volume= 8,258 cf
Outflow = 1.42 cfs @ 12.22 hrs, Volume= 8,258 cf, Atten= 46%, Lag= 7.8 min
Discarded = 0.21 cfs @ 11.41 hrs, Volume= 6,369 cf
Primary = 1.21 cfs @ 12.22 hrs, Volume= 1,889 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 132.26' @ 12.22 hrs Surf.Area= 1,072 sf Storage= 1,909 cf

Plug-Flow detention time= 43.6 min calculated for 8,255 cf (100% of inflow)
Center-of-Mass det. time= 43.6 min (850.8 - 807.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	129.00'	835 cf	**15.76'W x 68.00'L x 4.50'H Field A** 4,823 cf Overall - 2,039 cf Embedded = 2,784 cf x 30.0% Voids
#2A	130.00'	1,464 cf	**Shea Leaching Chamber 4x4x3** x 48 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 48 Chambers in 3 Rows
		2,299 cf	Total Available Storage

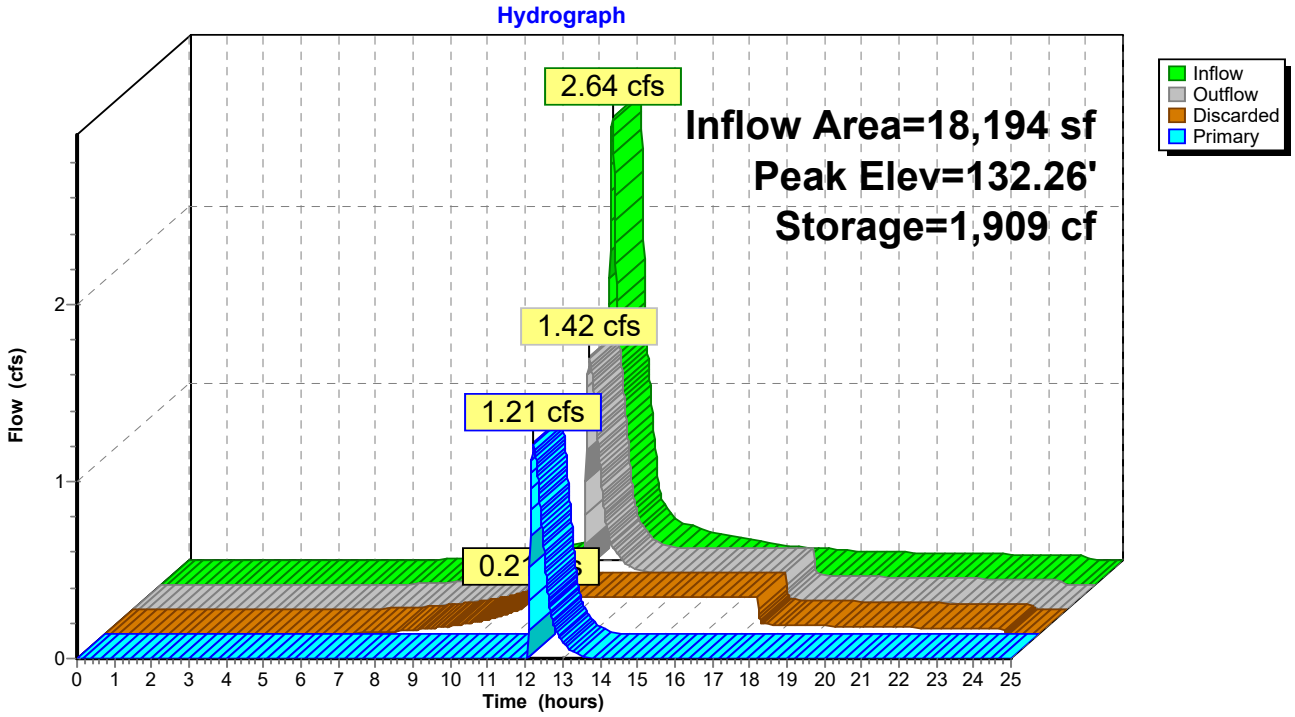
Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	129.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	131.50'	**10.0" Round Culvert** L= 56.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 131.50' / 128.00' S= 0.0619 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Discarded OutFlow Max=0.21 cfs @ 11.41 hrs HW=129.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.22 cfs @ 12.22 hrs HW=132.26' (Free Discharge)
↑**2=Culvert** (Inlet Controls 1.22 cfs @ 2.34 fps)

Pond 3P: UG System 3



Summary for Pond 4P: Basin 1

Inflow Area = 40,849 sf, 38.38% Impervious, Inflow Depth = 1.71" for 100-YR event
Inflow = 2.00 cfs @ 12.18 hrs, Volume= 5,809 cf
Outflow = 0.46 cfs @ 12.69 hrs, Volume= 5,809 cf, Atten= 77%, Lag= 30.5 min
Discarded = 0.40 cfs @ 12.69 hrs, Volume= 5,774 cf
Primary = 0.06 cfs @ 12.69 hrs, Volume= 35 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 127.52' @ 12.69 hrs Surf.Area= 2,098 sf Storage= 2,303 cf

Plug-Flow detention time= 51.9 min calculated for 5,806 cf (100% of inflow)
Center-of-Mass det. time= 51.9 min (885.5 - 833.6)

Volume	Invert	Avail.Storage	Storage Description
#1	126.00'	3,407 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

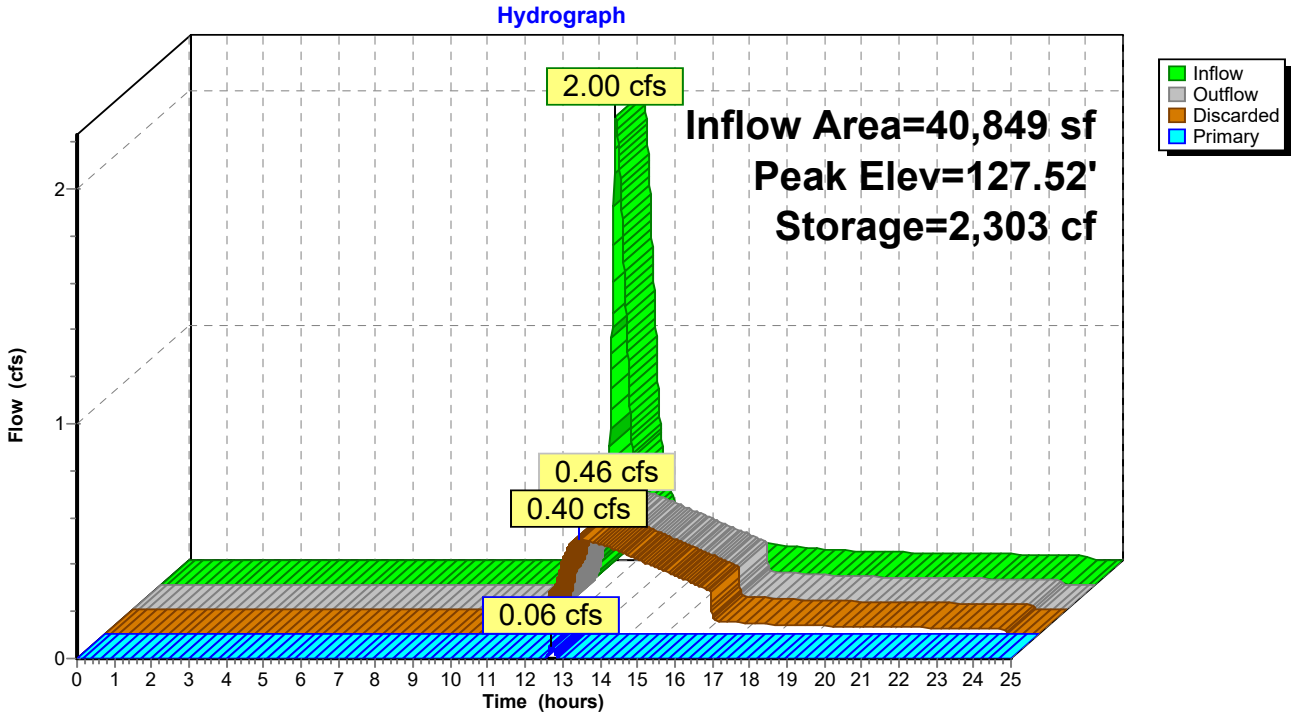
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
126.00	940	0	0
128.00	2,467	3,407	3,407

Device	Routing	Invert	Outlet Devices
#1	Discarded	126.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	127.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.40 cfs @ 12.69 hrs HW=127.52' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=0.05 cfs @ 12.69 hrs HW=127.52' (Free Discharge)
2=Broad-Crested Rectangular Weir (Weir Controls 0.05 cfs @ 0.31 fps)

Pond 4P: Basin 1



Summary for Pond 5P: Basin 2

Inflow Area = 19,738 sf, 35.31% Impervious, Inflow Depth = 2.23" for 100-YR event
Inflow = 1.35 cfs @ 12.14 hrs, Volume= 3,664 cf
Outflow = 0.33 cfs @ 12.55 hrs, Volume= 3,664 cf, Atten= 76%, Lag= 24.8 min
Discarded = 0.24 cfs @ 12.55 hrs, Volume= 3,617 cf
Primary = 0.09 cfs @ 12.55 hrs, Volume= 47 cf

Routing by Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
Peak Elev= 125.52' @ 12.55 hrs Surf.Area= 1,236 sf Storage= 1,327 cf

Plug-Flow detention time= 48.9 min calculated for 3,664 cf (100% of inflow)
Center-of-Mass det. time= 48.9 min (876.4 - 827.5)

Volume	Invert	Avail.Storage	Storage Description
#1	124.00'	1,971 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

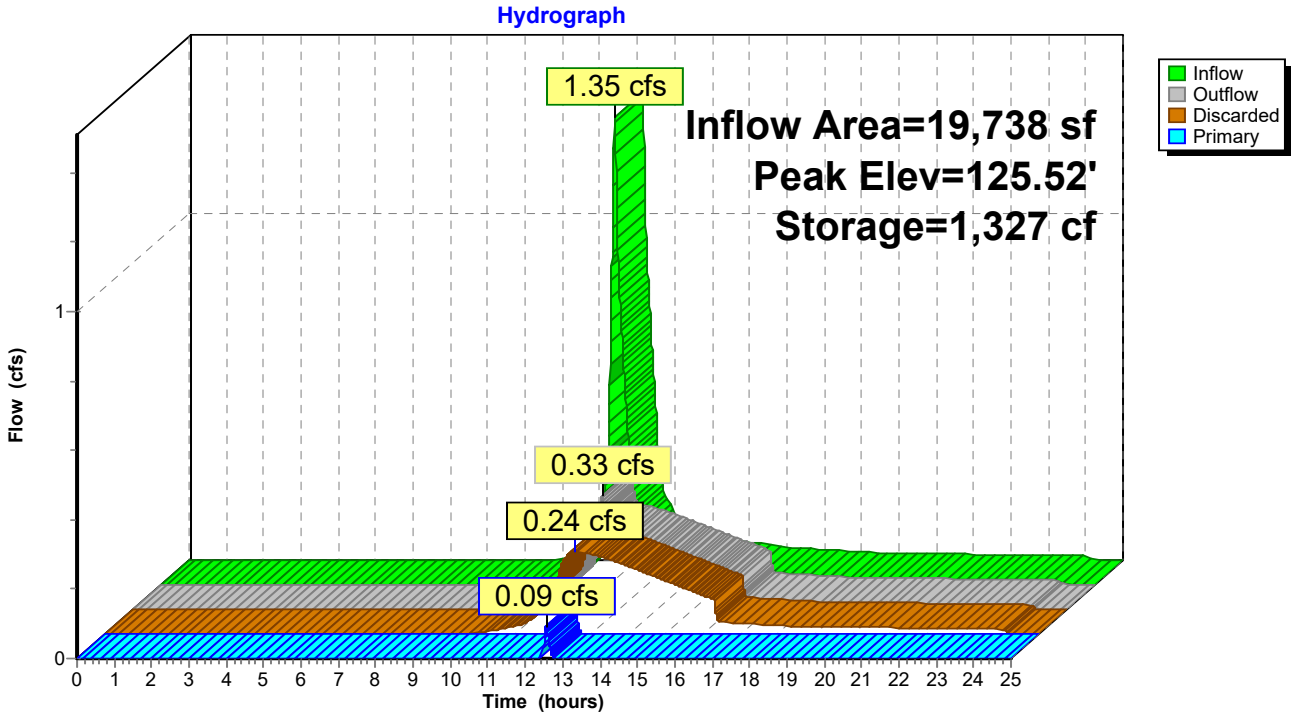
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.00	506	0	0
126.00	1,465	1,971	1,971

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.00'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	125.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.24 cfs @ 12.55 hrs HW=125.52' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

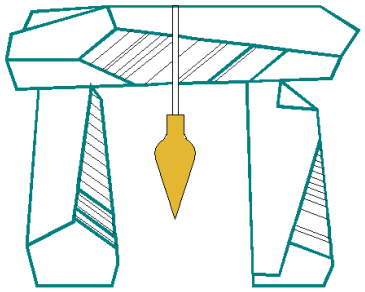
Primary OutFlow Max=0.09 cfs @ 12.55 hrs HW=125.52' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.09 cfs @ 0.37 fps)

Pond 5P: Basin 2



Appendix B Stormwater Operation & Maintenance Plan

DeCelle-Burke-Sala



& Associates, Inc.

Stormwater Operation & Site Maintenance Plan
for
Proposed Definitive Subdivision
at
217 Mill Street
Randolph, Massachusetts

Prepared by:
DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway
Suite 401
Quincy, MA 02169

Prepared for:
217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

Revised: April 10, 2023
February 6, 2023

Introduction

This Stormwater Operation & Maintenance Plan (SOMP) is for the definitive subdivision located at 217 Mill Street in Randolph, Massachusetts. The SOMP is outlined below to provide long term operation and maintenance procedures of the stormwater controls installed to manage the stormwater flow generated on the site. The landowners are required to implement the procedures and ensure the long term benefits of the stormwater controls approved and installed for this project. The SOMP provides simple operational and maintenance procedures for the stormwater control structures as well as perform various tasks to remove pollutants from areas that would have potential to be picked up on site and moved via stormwater offsite.

The landowners shall be responsible to implement this SOMP which requires them to inspect, maintain, and operate the stormwater management system as well as inspect the grounds for eroded areas and collected pollutants. The purpose of the SOMP is to maintain the long term benefits from the Stormwater Management features constructed that support groundwater recharge and pollution prevention.

Responsible Party -

217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

The responsible party listed above is responsible for inspecting, maintaining and keeping copies of maintenance records for the following plan and will be referred to as the Site Manager for the remainder of this report. The responsible party can expect a yearly budget of $1,500 to $2,000 per year to maintain this site.

All future property owners shall inherit the responsibility of implanting this SOMP. The current deed reference is found in the Norfolk County Registry of Deeds Book 14059 Page 498. This document shall be recorded at the Norfolk County Registry of Deeds with the deed reference. Upon any future transfer of ownership all future owners will be obligated to use, maintain, and continue to adhere to this Operation and Maintenance Plan in accordance with the manufacturers recommendations and all inspection records will be maintained and made available to the Town of Randolph upon request.

Illicit Discharge Statement

Per Standard No. 10 of the MassDEP Stormwater Management Standards, there shall be no illicit discharges to the stormwater management system. The Property Manager is responsible for implementing the Operation and Maintenance Plan and overseeing activities at the facility to prevent illicit discharges to the drainage system from occurring.

It is strictly prohibited to discharge any products or substances onto the ground surface or into any drainage structures, such as catch basin inlets, manholes, water quality units, forebays, basin or drainage outlets that would be a detriment to the environment.

Signature Date

Non-Structural Operations

Pavement Sweeping

Pavement sweeping will be performed by hand twice during the year, in April-May and in September-October. The Site Manager shall contract with a property management company that provides pavement sweeping services. The company shall be in good standing in the Commonwealth of Massachusetts and experienced in performing these services. All sweepings shall be disposed of by the hired company off-site in a legal manner.

Snow Management

Proper snow management practices will be implemented to maximize access and egress into the property. Plowed or shoveled snow will be placed in pervious areas at the edges of driveways and the roadway where it can slowly infiltrate. Snow will be placed on to pervious areas that are not subject to excessive shade from buildings or vegetation. All accumulated sediment from snowmelt shall be removed each spring.

Structural Operations

Deep Sump Catch Basins

The catch basins are installed to capture stormwater runoff and provide pretreatment for TSS and oils. The catch basin is fitted with a proprietary water quality outlet control assembly called a SNOUT® to assist in the efficiency of capturing TSS and oils. To ensure maximum capacity and efficiency, the deep sump catch basin sump will be cleaned when half of the available capacity of the sump has been used or at a minimum of once per year. The Manager shall inspect the sump on a quarterly basis. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in cleaning stormwater sumps with a vacuum truck. All sediment and water retrieved from the sumps shall be disposed of by the hired company off-site in a legal manner. The Manager shall provide a written inspection report of which an example form is attached.

SNOUT®

The SNOUT® is a locally manufactured stormwater treatment product that is a vented fiberglass water quality hood that is installed over the outlet pipe in a storm water structure with a sump that skims oils, floatables and trash off of the surface water while letting settleable solids sink to the bottom. The cleaner water exits from beneath the SNOUT, which is lower than the bottom of the pipe, but above the bottom of the structure allowing both floatable material and solids that sink to stay in the structure. The catch basin structure is fitted with the SNOUT®. The Manager shall inspect the SNOUT® quarterly, the same time the sump is inspected. The Site Manager shall hire a contractor in good standing in the Commonwealth of Massachusetts with experience in inspecting the SNOUT® and make sure it is operating as intended. If damaged, the SNOUT® shall be repaired or replaced entirely. The Manager shall provide a written inspection report of each SNOUT® which an example form is attached.

Contech CS-3 Cascade Separator Water Quality Manhole

The Cascade Separator (CS-3) water quality manholes were installed to provide additional pretreatment for the stormwater prior to infiltration. To ensure maximum capacity and efficiency, the CS-3 units should be inspected and cleaned in accordance with the manufacturer's specifications which have been included in Appendix A.

Underground Concrete Leaching Galleys

The underground concrete leaching galleys were installed to recharge stormwater runoff from the roadway, the driveways, and portions of landscaping area runoff. The roof runoff does not generate sediment, and with at grade flows captured by a deep sump catch basin with outlet hood treating the driveway and landscape runoff, the infiltration chambers shall remain effective for a long period of time. Inspection manholes are brought to grade to allow the Site Manager to observe if the chambers are ponding or accumulating sediment and to clean if necessary. To ensure maximum capacity and efficiency, the concrete chambers should be inspected and cleaned in accordance with the manufacturer's specifications.

Surface Infiltration Basin

Two surface infiltration basins have been constructed within the subdivision to allow for the attenuation of stormwater. The berm shall be stabilized and protected from erosion through the use of vegetation. The berm shall be inspected quarterly and after large storm events and maintained as necessary. If erosion is identified in the basin, the affected area will be stabilized and reseeded as required to maintain vegetative cover. This will prevent further instability occurring on the berm. The Manager shall hire a contractor that provides basin cleaning services for the entire stormwater management infrastructure. The contractor shall be a company in good standing in the Commonwealth of Massachusetts and experienced in performing the requested services. The debris and silt laden stormwater collected from the facilities shall be disposed of in a legal manner.

Site Management

The site shall be inspected on a quarterly basis for rutting, potholes, broken berms, depressions eroded areas and any other site damage caused by vehicular or human activity. Landscaped areas shall be raked as necessary to maintain their grade. Grassed areas shall be raked out and seeded as needed to maintain an even vegetated surface. A slow release natural fertilizer and a minimal amount of insecticides and herbicides shall be used for landscaping maintenance. The homeowner shall hire a contractor, if necessary, in good standing in the Commonwealth of Massachusetts with experience in site management to repair any potholes, broken berms, or other damaged exterior area. The homeowner shall hire a contractor, if necessary, in good standing in the Commonwealth of Massachusetts with experience in re-vegetating eroded areas and repairing vehicular surfaces and edges.

Record Keeping

Records of the inspections and maintenance for the Non-Structural and Structural Operations performed or organized by the homeowner for the property shall be up to date, available for review and inspection on-site and submitted to the Town of Randolph Conservation Department for review and record. Records shall be backlogged for three years before they are disposed of. An example record keeping sheet is attached.

Definitive Subdivision

217 Mill Street, Randolph, Massachusetts

Stormwater Operation & Site Maintenance Plan

INSPECTION SCHEDULE AND EVALUATION CHECKLIST

Best Management Practice	Inspection Frequency	Date Inspected	Contractor	Current Conditions and Minimum Maintenance / Repairs, if necessary	Completed Maintenance / Repair (i.e. date, contractor, tasks complete, etc...)
Pavement Sweeping	Biannually				
Deep Sump Catch Basins	Quarterly				
Snout®	Quarterly				
Contech CS-3 Cascade Separators	Per manufacturer's specs.				
Concrete Galleys	Per manufacturer's specs.				
Surface Infiltration Basins	Quarterly				
Overall Site Condition	Quarterly				

Per Standard No. 10 of the MassDEP Stormwater Management Standards, there shall be no illicit discharges to the stormwater management system. The Property Manager is responsible for implementing the Operation and Maintenance Plan and overseeing activities at the facility to prevent illicit discharges to the drainage system from occurring. It is strictly prohibited to discharge any products or substances onto the ground surface or into any drainage structures, such as catch basin inlets, manholes, water quality units, forebays, basin or drainage outlets that would be a detriment to the environment.

Property Manager: _____ **Date** _____

Appendix A

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator™ Inspection and Maintenance Guide

CASCADE
separator™

Maintenance

The Cascade Separator™ system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

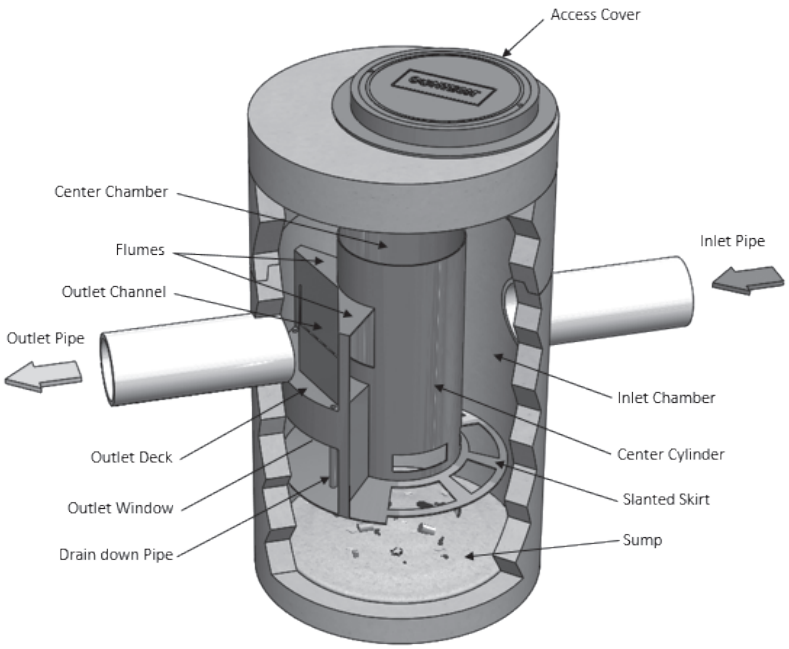
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches the 50% storage volume. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the total height of sediment storage sump.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum hose down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done is accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Water Depth to Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole opening to the top of the sediment pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the total height of sediment storage sump. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

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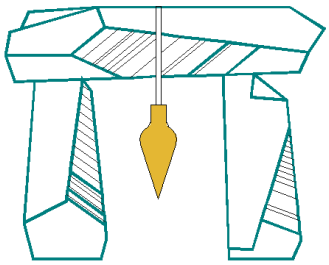
Appendix C Stormwater Pollution Prevention Plan

DeCelle-Burke-Sala



& Associates, Inc.

Stormwater Pollution Prevention Plan

for

217 Mill Street

a Definitive Subdivision
in
Randolph, Massachusetts

Prepared by:
DeCelle-Burke-Sala & Associates, Inc.
1266 Furnace Brook Parkway
Suite 401
Quincy, MA 02169

Prepared for:
McDermott Builders, Inc.
7 Whitelawn Avenue
Milton, MA 02186

Revised: April 10, 2023
February 6, 2023

Table of Contents

1.0 - Plan Objectives

- To protect abutting properties, public ways and drainage infrastructure from construction related pollutant impacts generated from land disturbance and construction activities;

- Control existing, and potential erosion, sediment transport and pollutant impact events by installing and maintaining construction related Best Management Practices (BMP's) to reduce and/or prevent the discharge of stormwater pollutants into wetland resources of the Commonwealth of Massachusetts;

- To protect surface stormwater quality, ground water quality, and minimize off-site sediment transport offsite during construction;

- To prevent local and off-site flooding by controlling peak rates and volumes of stormwater runoff during construction; and

- To eliminate illicit discharges to stormwater drainage systems that causes pollution during construction.

2.0 - Introduction

This Erosion and Sedimentation Control Plan (The "Plan") has been devised for the construction of a new rehabilitation building located at 217 Mill Street in Randolph, Massachusetts. The purpose of the Plan is to protect the surrounding environment from contaminated stormwater during construction of the development. The stormwater will be treated before release and surfaces stabilized to minimize erosive events by implementing, installing and maintaining construction related Best Management Practices (BMP's) to reduce and/or prevent the discharge of stormwater pollutants into wetland resources of the Commonwealth of Massachusetts. The BMP's are described in the Stormwater Management Standards developed by the Massachusetts Department for Environmental Protection and it is our belief that short term construction related pollution prevention generated from this site can be achieved.

3.0 - Current Site Conditions

The subject property is located at 217 Mill Street in the Town of Randolph. The Town of Randolph Assessor's office currently identifies the as Assessors ID 51-H-8.01 with a

total area of approximately 77,512± square feet (SF). The property is located within the Residential Single Family High Density (RSFHD) zoning district.

The site is bounded by Mill Street to the northeast, and is abutted by single-family residential properties to the east, south, and west. The dead end of Prospect Avenue is close to the locus, however, the property does not have any frontage on Prospect Avenue. The lot contains a 675± S.F. residential single-family dwelling that was constructed around 1950 per the Town's online property record database. In addition to the dwelling, there are two sheds located on the property. Vehicular access to the site is provided off Mill Street by a single-lane asphalt driveway to the west of the dwelling. The dwelling improvements include a deck on the westerly side of the building adjacent to the driveway, a concrete patio in the backyard and a concrete walkway along the front of the house. The vegetation in the northerly portion of the lot closest to Mill Street is predominately lawn, with several hedges and trees. The majority of the lot is covered by trees and considered wooded. A vinyl and chain-link fence traverse the rear of the property near the abutters located on Hart Circle. Topography on the site varies throughout the property. Elevations along the frontage of the property on Mill Street range from approximately elevation 126 in the northeasterly corner, to elevation 132 in the northerly corner. Topography slopes up roughly 27% from the northeasterly corner at elevation 126 up to the house at elevation 136. The driveway slopes approximately 13% up from Mill Street to the peak of the driveway. The high elevation on-site is located towards the center of the property within the woods. From the high point, the topography generally slopes down to the abutters to the east down to a low elevation of approximately 122. All elevations refer to the North American Vertical Datum of 1988 (NAVD 88).

The existing building is serviced by sewer, domestic water, and gas services that connect to the respective mains in Mill Street. Overhead wires connect from the dwelling to the existing overhead wires in Mill Street to provide power and communication services to the existing dwelling. A roof gutter system on the existing dwelling captures the majority of roof runoff and downspouts direct the water to flow overland. No other stormwater controls are located on-site, as flows from the asphalt driveway are not collected and runoff to Mill Street. The site is not located within a Special Flood Hazard Zone as delineated on FIRM 25021C0217E, effective 07/17/2012. There do not appear to be any jurisdictional wetlands within 100-feet of the project locus.

4.0 - Project Description

The proposed project is a subdivision, which will include the construction of four (4) new single-family houses and a proposed roadway. Access to the subdivision will be provided off Mill Street by a 40-ft. wide private way, which ends at a cul-de-sac with a 42-ft. pavement radius. The proposed street layout will have 24-ft. of pavement with vertical granite curbing on both sides. Each proposed single-family house will be provided vehicular access to the proposed road by a curb cut and asphalt driveway.

The street will be graded to have a 2.9% grade for the first approximately 19-ft. before transition to a 100-ft. Type IV Sag Vertical Curve. The roadway will have a slope of approximately 7% for approximately 10-ft. before transitioning to a 150-ft. Type I Crest Vertical Curve. The highpoint of the roadway will be located towards the front of the cul-de-sac and will slope down toward the end of the road. A retaining wall is proposed along the easterly side of the roadway from approximately station 0+55 to approximately station 1+75. The retaining wall is approximately 5-ft. tall at its highest point.

The proposed subdivision will be improved by public utilities for the use of the four (4) proposed dwellings. A proposed 8-in. PVC gravity sewer main is proposed to be installed for the length of the roadway. The proposed sewer main will tie into the existing 8-in. PVC sewer main in Mill Street by constructing a doghouse manhole in Mill Street. A sewer manhole is proposed at the end of the proposed sewer main in the cul-de-sac of the proposed roadway. Each house will tie into the proposed sewer main by gravity with proposed 4-in. PVC sewer services. An 8-in. CLDI (cement-lined ductile iron) water main will be installed for the length of the roadway. The proposed water main will tie into the existing water main in Mill Street. Each house will be provided water service by a 1-in. “type K” copper pipe. A fire hydrant is proposed at the end of the proposed 8-in. water main and will be located within the cul-de-sac of the proposed roadway. A proposed gas main shall be installed by the local utility purveyor’s standards to provide gas service to each dwelling. Power and communication services will be provided by underground wires. A transformer will be installed within the subdivision.

Proposed stormwater controls shall comply with local, state and federal regulations. Stormwater generated by the proposed street will be collected, treated, and infiltrated to protect the down gradient abutting properties. The proposed stormwater management systems is comprised of a total of five (5) deep sump catch basins, two (2) proprietary water quality units, three (3) subsurface infiltration systems constructed of precast concrete leaching galleys and two surface infiltration basins. The majority of the stormwater runoff on site is produced by the asphalt roadway and proposed buildings.

Subsurface Infiltration System 1 consists of nine (9) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 1 collects the majority of the roadway by two deep sump catch basins located near the intersection of the proposed roadway and Mill Street. The catch basins convey the stormwater runoff to a proprietary water quality unit which pretreats the runoff prior to it being released to the subsurface infiltration system. System 1 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of a larger storm event the stormwater runoff will by-pass the proposed catch basins and be collected by the existing drainage system in Mill Street. Subsurface System 2 is centrally located on the site and collects the stormwater runoff from the remainder of the twenty four (24) foot wide roadway. Stormwater runoff is captured by two (2) deep sump catch basins and conveyed to a proprietary water quality unit for pretreatment before it is release to Subsurface System 2. System 2 consists of twelve (12) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 2 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of larger storm events, System 2 has been fitted with a 12 inch outlet pipe which extends to Surface Basin 2 where it is released onto a riprap outlet protection apron. Subsurface system 3 collects the entirety of the cul-de-sac through a single deep sump catch basin. The deep sump catch basin conveys the stormwater runoff to a proprietary water quality unit for pretreatment before it is released to Subsurface System 3. System 3 consists of forty eight (48) 4'x4'x4' precast concrete leaching galleys and surrounding stone. System 2 has been designed to infiltrate the required recharge volume, decrease the peak runoff flows leaving the site and contain the entirety of the 10-year storm event. In the event of larger storm events, System 2 has been fitted with a 12 inch outlet pipe which extends to Surface Basin 1 where it is released onto a riprap outlet protection apron.

Surface Basin 1 is a 2,456± S.F. surface infiltration basin which contains and infiltrates stormwater runoff from overland flow, the proposed roofs and overflow from Subsurface System 3. Basin 1 has been designed to infiltrate the entirety of the 2-, 10-, and 25-year storm events with allowing a minor amount of sheet flow released for the 100-year storm event. Surface Basin 2 is a 1,435± S.F. surface infiltration basin which detains and infiltrates stormwater runoff from overland flow, the proposed roofs and overflow from Subsurface System 2. Basin 2 has been designed to infiltrate the entirety of the 2-, 10-, and 25-year storm events with allowing a minor amount of sheet flow released for the 100-year storm event. The basins shall be grassed with an emergency riprap outlet weir as an overflow.

5.0 - Erosion & Sedimentation Control Plan

The contractor shall implement an Erosion and Sedimentation Control Plan that protects the surrounding environment from sediment laden stormwater runoff generated during construction activities and from other pollutants generated from construction activities such as litter and dust. Construction sequencing is part of managing a site as is implementing many BMP's that assist in controlling construction related pollutants.

5.1 - Major Construction Sequence for Site

The sequence is developed to contain all potential sedimentation and erosion incidents that could occur during the construction of the project. The contractor however is responsible to manage the site effectively to control offsite sediment transport which may not be included in this plan. The sequence will coordinate the work within the erosion barrier and coordinate other sedimentation control features to reduce the stress upon a silt fence as well as limit off-site sediment transport. The sequencing is as follows:

- Place safety fence around property to limit access and protect the public.
- Place erosion control barrier at limit of work where possible. The barrier shall be 12" diameter mulch wattles.
- Provide inlet protection for existing drainage structures on and off-site to minimize sediment buildup in the catch basins.
- Install crushed stone construction entrance to reduce soil tracking off-site by construction vehicles.
- Cut and cap/disconnect all existing utilities as shown on the plans.
- Raze existing buildings.
- Grub site, stockpile loam on site, and surround in erosion control barrier and cover to minimize sediment transport from stormwater runoff.
- Rough grade the site.
- Rough grade surface detention basins. Limit construction activities around the surface detention basins to minimize compaction of existing soils.
- Install proposed roadway utilities. Install silt sacks in catch basins as soon as they have been installed.
- Install concrete Infiltration Systems 1, 2 & 3.
- Final grade the proposed roadway.
- Install asphalt binder course for roadway.
- Install vertical granite curbing.
- Connect roadway drainage to the underground infiltration structures.
- Excavate for proposed foundations.

- Construct proposed foundations.
- Extend utility services to the proposed foundations.
- Begin vertical construction.
- Final grade the site.
- Install asphalt binder course for driveways.
- Install final landscaping, including hydroseed, plantings, light poles, walkways, handicap ramps and stairs.
- Place final asphalt top coat on roadway and driveways.
- Clean up site.

The contractor has several procedures to perform to maintain the site. They include but are not limited to:

- Clean pavement of sediment as needed.
- Replace erosion control barrier at limit of work as needed. Barrier to be inspected on a weekly basis.
- Empty silt sacks after each rain event. Catch basins and manholes to be cleaned once sediment occupies 1/2 the sump available. Structures to be inspected on a weekly basis.
- Any stockpiled soils to be covered to minimize fugitive dust.
- Maintain a covered dumpster on site to minimize wind blown debris from littering neighborhood and resource areas.
- Have a water truck onsite during the excavation for the project and during rough grading to minimize fugitive dust.

5.2 - Best Management Practices

The contractor shall use various types of structural and non-structural methodologies to minimize offsite polluting from construction activities. The following is a list of some BMP's that can be utilized; however, it is the contractor's responsibility to implement his strategies to minimize offsite sediment transport and fugitive dust and trash.

5.2.1 - Dumpster

The contractor shall have a dumpster on-site for the disposal of construction debris. The contractor shall cover the dumpster as needed to prevent wind blown debris from becoming litter in the environment.

5.2.2 - Silt Collection and Filter Bags

The contractor shall install filter sacks in all catch basins which may collect construction site stormwater runoff. The filter sacks will be inspected periodically for effectiveness and serviceability.

5.2.3 - Mechanical or Hand Sweeper

The contractor shall sweep the site by mechanical means or by hand to reduce the sediment build-up on-site. This will reduce the surrounding area becoming impacted from construction related offsite sediment pollution.

5.2.4 - Crushed Stone Construction Apron

A crushed stone apron shall be installed at the entrance to the site to assist in removing caked soil on construction vehicle tires. The apron shall be twenty five by twenty five foot wide. The contractor shall inspect the apron on a daily basis and supplement new stone as needed.

5.2.5 - Erosion Control Barrier

An erosion control barrier shall be installed at the downgradient Limit of Work and used around the site as needed. A barrier shall also be used around soil stockpiles and localized excavations on site. The barrier needs to be effective in controlling sediment transport and not becoming strained as the project moves forward. The contractor shall inspect the barrier weekly or after a large storm event to identify any stressed areas and replace the barrier as needed. The barrier can be one or many of several types. Staked haybales, a geotextile fabric or a geotextile erosion control sock are typical types of barriers. The contractor shall inspect the barriers on a daily basis and repair the barriers as needed.

5.2.6 - Dust Control

The use of a water truck or other method to spray water over the site during the dry season to minimize blown dust shall be implemented. The water shall not be excessively spread so erosive forces occur. The contractor shall sweep the pavement once installed and cover stockpiled soils as needed to minimize dust.

5.2.7 - Disturbed Surface Maintenance

The contractor shall stabilize the ground surface as needed to prevent erosion. Stabilization of surfaces includes the placement of pavement, rip rap, wood bark mulch and the establishment of vegetated surfaces. Upon the completion of construction of a particular phase, all surfaces should be stabilized even though it is apparent that future construction efforts will cause their disturbance. Vegetated cover should be established during the proper growing season and should be

enhanced by soil adjustment for proper pH, nutrients and moisture content. Surfaces that are disturbed by erosion processes or vandalism should be stabilized as soon as possible. Areas where construction activities have permanently or temporarily ceased should be stabilized within 14 days from the date of last construction activity, except when construction activity will resume within 21 days (e.g., the total time period that construction activity is temporarily ceased is less than 21 days). Hydro-mulching of grass surfaces is recommended, especially if seeding of the surfaces is required outside the normal growing season. Mulching may be used for temporary stabilization. Haybale dikes or silt fences should be set where required to trap products of erosion and should be maintained on a continuing basis during the construction process. Wheel ruts should be filled in and graded to prevent concentration of stormwater runoff. Vehicle tracks leading downhill should be blocked during periods of intense precipitation by hay bales, dikes or silt fences which should be constructed to entrap the sediment.

5.2.8 - Temporary Stormwater Controls

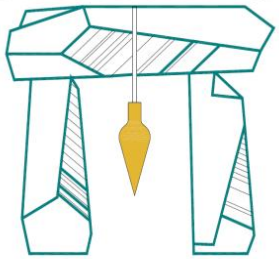
The contractor shall rough grade the site as to not concentrate the stormwater runoff and cause erosive forces. The contractor shall use a level spreader or other temporary stormwater control device to treat construction site runoff for suspended solids. The catch basins and manholes can be installed to assist in capturing the construction site runoff once installed but the tanks will need to be cleaned out of all sediment before connecting the tanks to the recharge system and final paving. The use of silt sacks on the catch basin will help minimize the cleaning of the sumps. The contractor shall sweep the pavement once installed as needed to minimize suspended solids in the stormwater.

Appendix D Supporting Information

Standard 3 & 4–Groundwater Recharge & Water Quality Volume Calculations

Required Recharge/Water Quality Volume Calculations

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC

Date: 4/11/2023

Given:

Total Impervious Area (A): 27,188 s.f.

Target Depth Factor (F): 0.6 inches over impervious area

Required Water Quality Volume (R_{wqv}): 1 inches over impervious area

Solve:

Required Recharge/Water Quality Volume
= A x F or R_{wqv} (whichever is greater)

2,265.7 c.f

Proposed Recharge Volume (V): (*based on HydroCAD volumes)

			A per system		R_{wqv} per system		
Subsurface System 1	=	700 c.f.	4,541	s.f.	376.9	c.f.	V>Rwqv
Subsurface System 2	=	358 c.f.	3,210	s.f.	266.4	c.f.	V>Rwqv
Subsurface System 3	=	1,383 c.f.	11,917	s.f.	989.1	c.f.	V>Rwqv
Surface Basin 1	=	2,269 c.f.	3,760	s.f.	312.0	c.f.	V>Rwqv
Surface Basin 2	=	1,298 c.f.	3,760	s.f.	312.0	c.f.	V>Rwqv
Total	=	6,008 c.f.	Proposed Volume > Required Volume				

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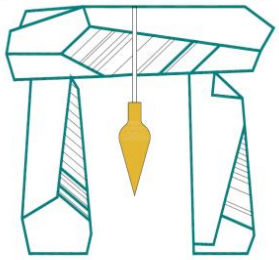
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Standard 3 – Groundwater Mounding Calculations

Groundwater Mounding Inputs for Subsurface System 3

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC

Date: 4/10/2023

Specific Yield Values (Sy)

Water Laid Deposits:	0.2	
(Lacustrine Deposits)		
Wind Blown Deposits:	0.2	
(Eolian Deposits)		
(conservative)		
Ice Laid Deposits:	0.15	*(Typical Sy value for New England)*
(Compact/Ablation Till)		

per "Summary of Hydrologic and Physical Properties of Rock and Soil Materials, as Analyzed by the Hydrologic Laboratory of the U.S. Geoligical Survey 1948-60, D.A. Morris and A.I. Johnson

Rawls Rate = 8.27 in/hr

Horizontal Hydraulic Conductivity (Kh)

Kh=Rawls Rate (in/hr) x 1 ft. / 12 in. x 24 hr / 1 day x 10

Kh= 8.27 x 20 ft-hr/in-day

= 165.4 ft/day

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Recharge Rate Calculation (R)=		16.54	ft/day
Length of Field=	68	ft	1/2 Length= 34
Width of Field=	15.75	ft	1/2 Width= 7.875

Duration of Infiltration, (t)

t= Basin Depth (ft) / Recharge Rate (ft/day)

t= 24.15 hours

*If designing a system with an outlet then the duration of infiltration (t) shall be taken from the HydroCAD model and should equal the time when the discarded volume equals 0. Make sure to set the time span for 0-72 hours.

** If the initial mound is above the bottom of the inifltration basin then increase the duration of infiltration to a maximum of 3 days to see if it decreases the mound height. This is allows for more horizontal flow away from the basin before the mound hight peaks and is a more conservative approach according to Glen Carleton (creator of simulation).

Initial Saturated Thickness (hi)=Depth from ESHGW to Bedrock

= 30' based on well information in the surrounding area

Input Data

Solutions to be input into Hantush Excel Spreadsheet

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

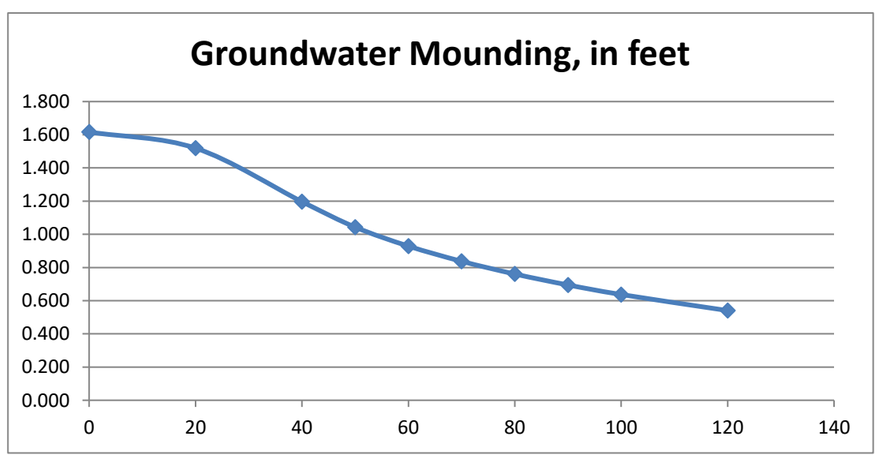
Input Values

16.5400	***R***	**Recharge (infiltration) rate (feet/day)**
0.150	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
165.40	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
34.000	**x**	**1/2 length of basin (x direction, in feet)**
7.875	**y**	**1/2 width of basin (y direction, in feet)**
1.006	**t**	**duration of infiltration period (days)**
30.000	**hi(0)**	**initial thickness of saturated zone (feet)**

31.617	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
1.617	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
1.617	0
1.519	20
1.197	40
1.043	50
0.929	60
0.837	70
0.761	80
0.695	90
0.637	100
0.541	120

Re-Calculate Now

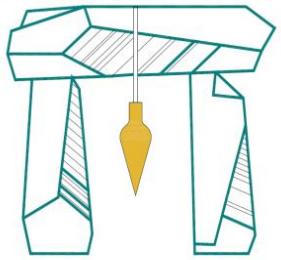


Disclaimer

Standard 3 – Drawdown Time Calculations

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC
228 Park Ave S, PMB 35567, New York, NY

Date: 4/10/23

100-Yr Storm Event Drawdown Time Calculation
Subsurface System 1

Find: T= Infiltration System Volume / (K)(Bottom Area)

Given:

Bottom Area = Length x Width

= 39.00 x 7.50 = 292.5 s.f.

System Volume= 700.00 c.f. (*volume of system below outlet from HydroCAD)

K= 8.27 in/hr K (Hydraulic Conductivity-use Rawls Rate)

Solve:

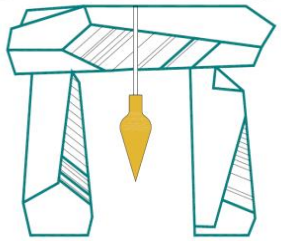
$$Time_{drawdown} = \frac{700 \text{ c.f.}}{(8.27 \text{ in/hr}/12 \text{ in/ft}) \times 292.5 \text{ s.f.}}$$

$Time_{drawdown}$ = 3.5 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC
228 Park Ave S, PMB 35567, New York, NY

Date: 4/10/23

100-Yr Storm Event Drawdown Time Calculation
Subsurface System 3

Find: T= Infiltration System Volume / (K)(Bottom Area)

Given:

Bottom Area = Length x Width

= 68.00 x 15.75 = 1071 s.f.

System Volume= 1383.00 c.f. (*volume of system below outlet from HydroCAD)

K= 8.27 in/hr K (Hydraulic Conductivity-use Rawls Rate)

Solve:

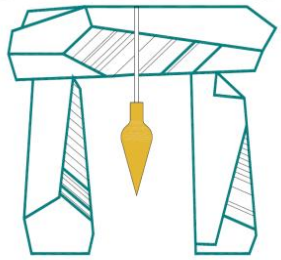
$$Time_{drawdown} = \frac{1383 \text{ c.f.}}{(8.27 \text{ in/hr}/12 \text{ in/ft}) \times 1071 \text{ s.f.}}$$

$Time_{drawdown}$ = 1.9 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC
228 Park Ave S, PMB 35567, New York, NY

Date: 4/10/23

100-Yr Storm Event Drawdown Time Calculation
Subsurface System 2

Find: T= Infiltration System Volume / (K)(Bottom Area)

Given:

Bottom Area = Length x Width

= 20.00 x 17.50 = 350 s.f.

System Volume= 358.00 c.f. (*volume of system below outlet from HydroCAD)

K= 8.27 in/hr K (Hydraulic Conductivity-use Rawls Rate)

Solve:

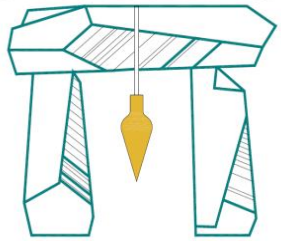
$$Time_{drawdown} = \frac{358 \text{ c.f.}}{(8.27 \text{ in/hr}/12 \text{ in/ft}) \times 350 \text{s.f.}}$$

$Time_{drawdown}$ = 1.5 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA
Client: 217 Mill St, LLC
228 Park Ave S, PMB 35567, New York, NY
Date: 4/10/23

100-Yr Storm Event Drawdown Time Calculation
Surface Basin 1

Find: T= Infiltration System Volume / (K)(Bottom Area)

Given:

Bottom Area = From HydroCAD

= 2085.00

System Volume= 2269.00 c.f. (*volume of system below outlet from HydroCAD)

K= 8.27 in/hr K (Hydraulic Conductivity-use Rawls Rate)

Solve:

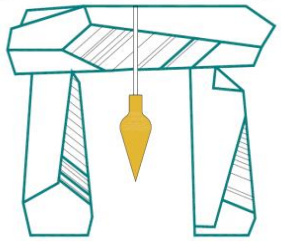
$Time_{drawdown}$ = 2269 c.f. / (8.27 in/hr/12 in/ft) x 2085s.f.

$Time_{drawdown}$ = 1.6 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA

Client: 217 Mill St, LLC
228 Park Ave S, PMB 35567, New York, NY

Date: 4/10/23

100-Yr Storm Event Drawdown Time Calculation
Surface Basin 2

Find: T= Infiltration System Volume / (K)(Bottom Area)

Given:

Bottom Area = From HydroCAD

= 1225.00

System Volume= 1298.00 c.f. (*volume of system below outlet from HydroCAD)

K= 8.27 in/hr K (Hydraulic Conductivity-use Rawls Rate)

Solve:

$Time_{drawdown}$ = 1298 c.f.

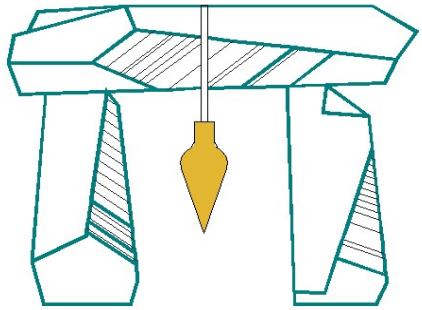
(8.27 in/hr/12 in/ft) x 1225s.f.

$Time_{drawdown}$ = 1.5 hrs < 72 hrs **CHECKS OK**

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Standard 4 – TSS Removal Calculations

DeCelle-Burke-Sala



& Associates, Inc.

Project: **Proposed Definitive Subdivision**
Location: **217 Mill Street, Randolph, MA**
Date: **1/24/2023**

Pretreatment Tss Removal Calculation

BMP	TSS Removal	Start Load	Amount Removed	Remaining Load
Contech CS3	50%	100%	50%	50%
Infiltration Systems	80%	50%	40%	10%
Remaining Load		10%	0%	10%

DeCelle-Burke-Sala Associates, Inc.
1266 Furnace Brook Parkway, Quincy, MA 02169
PH:(617)-405-5100 FX:(617)-405-5101

Standard 4 - Equivalent Flow Rate Calculations

Calculation Sheet

DECELLE-BURKE-SALA
& Associates, Inc.

Project: Clifton Court Development
217 Mill Street
Randolph, MA
Client: 217 Mill Street, LLC
228 Park Avenue S, New York, NY
Date: 4/10/2023

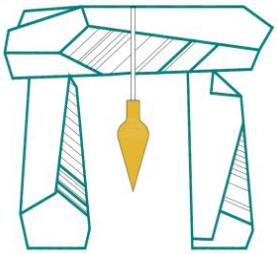
Required WQV to a Discharge Rate Calculation

Proposed CS-3 (1)	Maximum Treatment Flow Rate (MTFR)=				1.02	cfs
Time of Concentration (Tc)=	6.0 mins.= 0.1 hrs					
Unit Peak Discharge (qu)=	774	csm/in				
Water Quality Volume (WQV)=	1	in.				
Impervious Surface Drainage Area (A)=	4,541	sf	=	0.00016	mi^2	
$Q_{0.5}$=(qu)(A)(WQV) =	0.13	cfs				
CHECKS OK						
Proposed CS-3 (2)	Maximum Treatment Flow Rate (MTFR)=				1.02	cfs
Time of Concentration (Tc)=	6.0 mins.= 0.1 hrs					
Unit Peak Discharge (qu)=	774	csm/in				
Water Quality Volume (WQV)=	1	in.				
Impervious Surface Drainage Area (A)=	3,210	sf	=	0.00012	mi^2	
$Q_{0.5}$=(qu)(A)(WQV) =	0.09	cfs				
CHECKS OK						

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Calculation Sheet

DECELLE-BURKE-SALA



& Associates, Inc.

Project: Definitive Subdivision Plan
217 Mill Street
Randolph, MA

Client: 217 Mill Street, LLC
228 Park Avenue S, New York, NY

Date: 2/6/2023

Required WQV to a Discharge Rate Calculation

Proposed CS-3 (3)	Maximum Treatment Flow Rate (MTFR)=		1.02	cfs	
Time of Concentration (Tc)=	6.0 mins.= 0.1 hrs				
Unit Peak Discharge (qu)=	774	csm/in			
Water Quality Volume (WQV)=	1	in.			
Impervious Surface Drainage Area (A)=	11,917	sf	=	0.00043	mi²
$Q_{0.5}$=(qu)(A)(WQV)	=	0.33	cfs		

CHECKS OK

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Standard 4 - Proprietary BMP Data

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
401-02B
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. MCCABE
Commissioner

May 18, 2020

Derek M. Berg
Director – Stormwater Regulatory Management - East
Contech Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Re: MTD Lab Certification
Cascade Separator™
On-line Installation

TSS Removal Rate 50%

Dear Mr. Berg:

This revised certification letter supersedes the Department's prior certification dated October 1, 2019. This revision was completed to reflect Contech's enhanced fabrication capability to manufacture a smaller-size unit of its the Cascade Separator™ Manufactured Treatment Device (MTD), while still meeting the scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. Based on this modification, Table A-1 of the New Jersey Corporation for Advanced Technology (NJCAT) Verification report located at http://www.njcat.org/uploads/newDocs/NJCATTechnologyVerificationFinal.pdf has been revised to specify this smaller unit and associated maximum treatment flow rate. Table 1 below has been revised to reflect this same updated model size and flow rate.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions, LLC (Contech) has requested an MTD Laboratory Certification for the Cascade Separator™ stormwater treatment system.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25,

2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated September 2019) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the Cascade Separator™ stormwater treatment system at a TSS removal rate of 50% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The Cascade Separator™ shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.

3. This Cascade Separator™ cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Cascade Separator™. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Cascade-Maintenance%20Guide.pdf?ver=2018-11-05-093254-300. for any changes to the maintenance requirements.

6. Sizing Requirement:

   The example below demonstrates the sizing procedure for the Cascade Separator™:

   Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a Cascade Separator™. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:

time of concentration = 10 minutes
i = 3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
c = 0.99 (runoff coefficient for impervious)
Q = ciA = 0.99 x 3.2 x 0.25 = 0.79 cfs

Given the site runoff is 0.79 cfs and based on Table A-1 below, the Cascade Separator™ Model CS-3 with an MTFR of 1.02 cfs would be the smallest model approved that could be used for this site to remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1.

Table A-1 Cascade Separator™ Models and Associated MTFRs

Model	Manhole Diameter (ft)	MTFR (cfs)	50% Maximum Sediment Storage Area Volume (ft^3)
CS-3	3	1.02	5.3
CS-4	4	1.80	9.4
CS-5	5	2.81	14.7
CS-6	6	4.05	21.2
CS-8	8	7.20	37.7
CS-10	10	11.3	58.9
CS-12	12	16.2	84.8

A detailed maintenance plan is mandatory for any project with a stormwater BMP subject to the Stormwater Management rules under N.J.A.C. 7:8. The plan must include all of the items identified in the Maintenance requirements section of the Stormwater Management rules under N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Brian Salvo of my office at (609) 633-7021.

Sincerely,

Gabriel Mahon

Gabriel Mahon, Chief
Bureau of Nonpoint Pollution Control

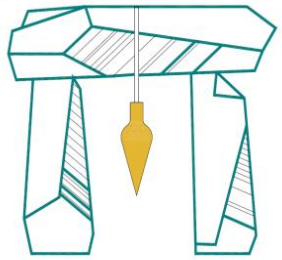
Attachment: Maintenance Plan

cc: Chron File
Richard Magee, NJCAT
Jim Murphy, NJDEP-BNPC
Vince Mazzei, NJDEP-DLUR
Brian Salvo, NJDEP-BNPC

Soil Information

Soil Log

DECELLE-BURKE-SALA



& Associates, Inc.

Location: Clifton Court Development
217 Mill Street
Randolph, MA

S.E.: Kameron Campbell, S.E. 14227

Date: 2/22/2023

Test Pit 1 : 8:30 am

Depth	Horizon	Texture	Color	Structure	Consistence
0-12	Ap	SL	10YR3/2	Granular	Very Friable
12-24	Bw	SL	10YR5/6	Massive	Friable
24-41	C1	Sand	2.5Y5/3	Single Grained	Loose
41-75	C2	Sand	2.5Y5/3	Single Grained	Loose
75-114+	C3	Sand	2.5Y5/3	Single Grained	Loose

Redox @ 72"

Standing Water @ 114"

C1 - gravelly coarse sand

C2 - medium sand, very little to no gravel

C3 - gravelly, coarse sand with cobbles present

Test Pit 2 : 9:08 am

Depth	Horizon	Texture	Color	Structure	Consistence
0-12	Ap	SL	10YR3/2	Granular	Very Friable
12-30	Bw	SL	10YR5/6	Massive	Friable
30-84+	C	Sand	2.5Y5/4	Single Grained	Loose

C - gravelly coarse sand with large cobbles present

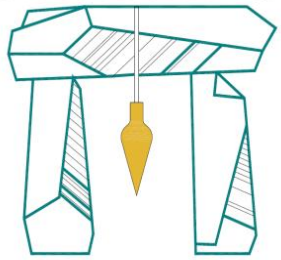
*hit a large boulder that the mini excavator could not get past

No Groundwater Observed

DeCelle-Burke-Sala and Associates, Inc.
1266 Furnace Brook Parkway #401 Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)

Soil Log

DECELLE-BURKE-SALA



& Associates, Inc.

Location: Clifton Court Development
217 Mill Street
Randolph, MA

S.E.: Kameron Campbell, S.E. 14227

Date: 2/22/2023

Test Pit 3 : 9:50 am

Depth	Horizon	Texture	Color	Structure	Consistence
0-9	Ap	SL	10YR3/2	Granular	Very Friable
9-24	Bw	SL	10YR5/6	Massive	Friable
24-84	C	Sand	2.5Y5/4	Single Grained	Loose

C3 - gravelly, coarse sand with cobbles present

Cobbles tight in place, small mahine had difficulty moving them due to size

No Groundwater Observed

Test Pit 4 : 10:09 am

Depth	Horizon	Texture	Color	Structure	Consistence
0-10	Ap	SL	10YR3/2	Granular	Very Friable
10-24	Bw	SL	10YR5/6	Massive	Friable
24-120^{+}	C	Sand	2.5Y5/4	Single Grained	Loose

C - gravelly coarse sand with cobbles present

No Groundwater Observed

Supporting Maps

Assessors Map

USGS Map

Soils Map

FEMA Map

View Details

Google Maps Link

Town of Randolph

Property Record Card

Property

Address	217 MILL ST
ID	51-H-8.01

Ownership

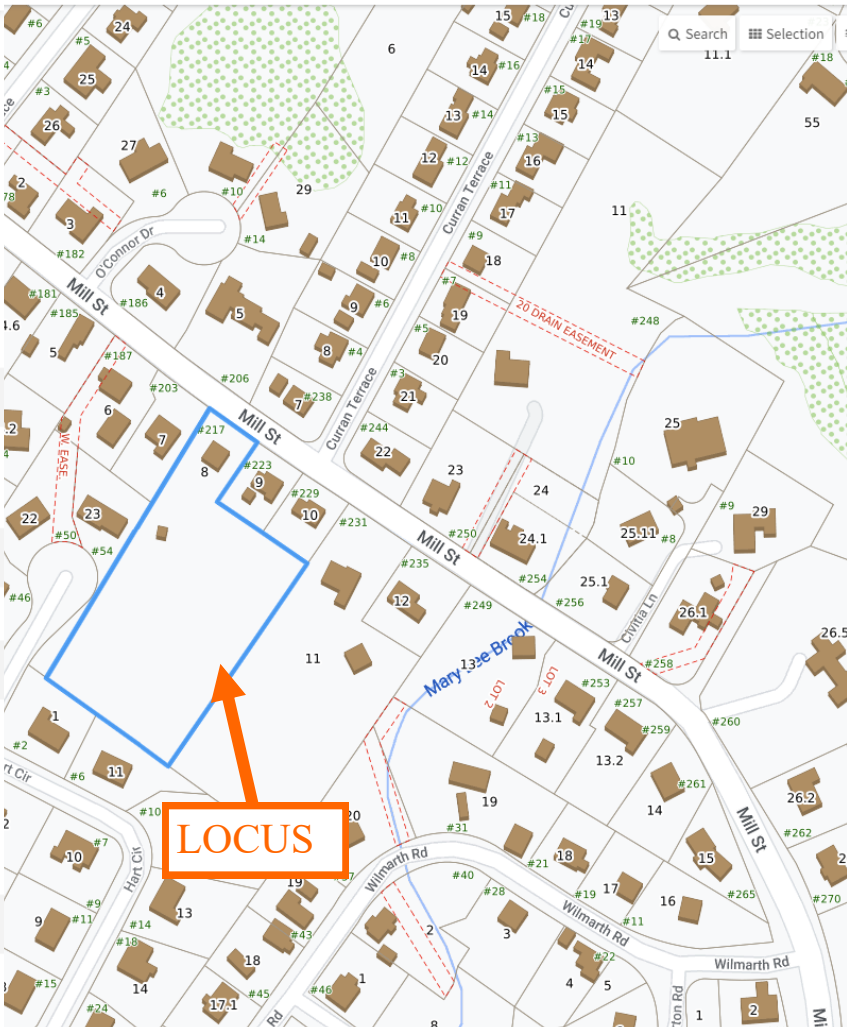
Name	ARSENAULT FAMILY TRUST

Valuation

Total	$440,700
Land	$251,600
Last Sale	$100 on 2000-03-21
Book/Page	14059/498

Land

Area	1.78



DATE:	TITLE:	SCALE:
April 10, 2023	***Assessors Map***	*NOT TO SCALE*

PREPARED FOR:

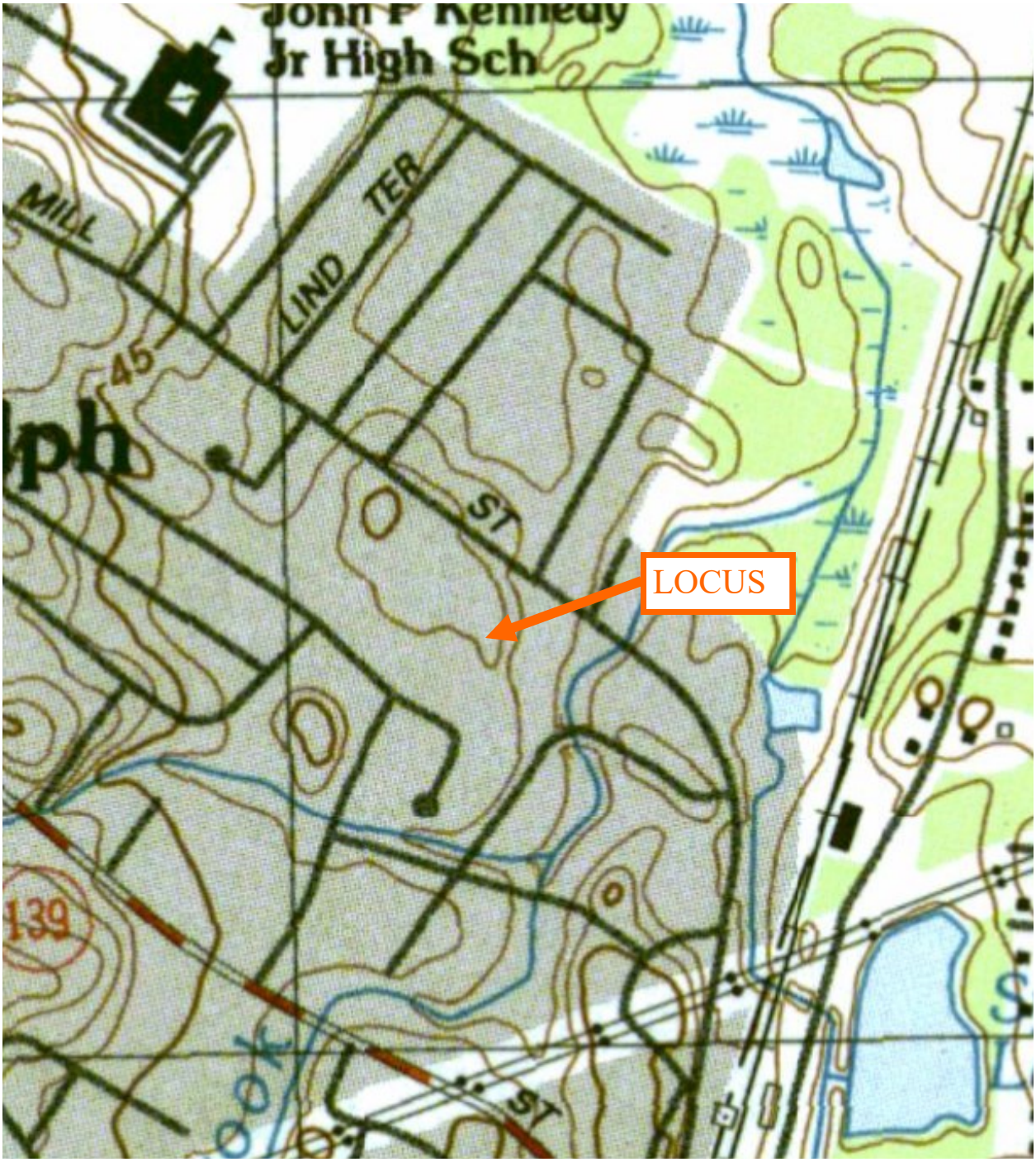
217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Definitive Subdivision
217 Mill Street
Randolph, Mass.



DATE:	TITLE:	SCALE:
April 10, 2023	**USGS Map**	*NOT TO SCALE*

PREPARED FOR:

217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

DeCelle-Burke-Sala
& Associates, Inc.
1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Definitive Subdivision
217 Mill Street
Randolph, Mass.

Hinckley loamy sand, 3 to 8 percent slopes (245B)

▲ Map Unit Composition

85% - ***Hinckley***
Geomorphic Position: *kame terraces*

8% - ***Windsor***
Geomorphic Position: *kame terraces*

5% - ***Sudbury***
Geomorphic Position: *kame terraces*

2% - ***Agawam***
Geomorphic Position: *kame terraces*

▲ Map Unit Data

Map Unit Key: *791714* *[Graphical Summary]*

National Map Unit Symbol: *2svm8*

Map Unit Type: *Consociation* ?

Farmland Class: *Farmland of statewide importance*

Available Water Storage (0-100cm): *6.61 cm*

Flood Frequency (Dominant Condition): *None*

Flood Frequency (Maximum): *None*

Ponding Frequency: *0*

Drainage Class (Dominant Condition): *Excessively drained* ?

Drainage Class (Wettest Component): *Excessively drained* ?

Proportion of Hydric Soils: *0%* ?

Min. Water Table Depth (Annual): *n/a*

Min. Water Table Depth (April-June): *n/a*

Min. Bedrock Depth: *n/a*

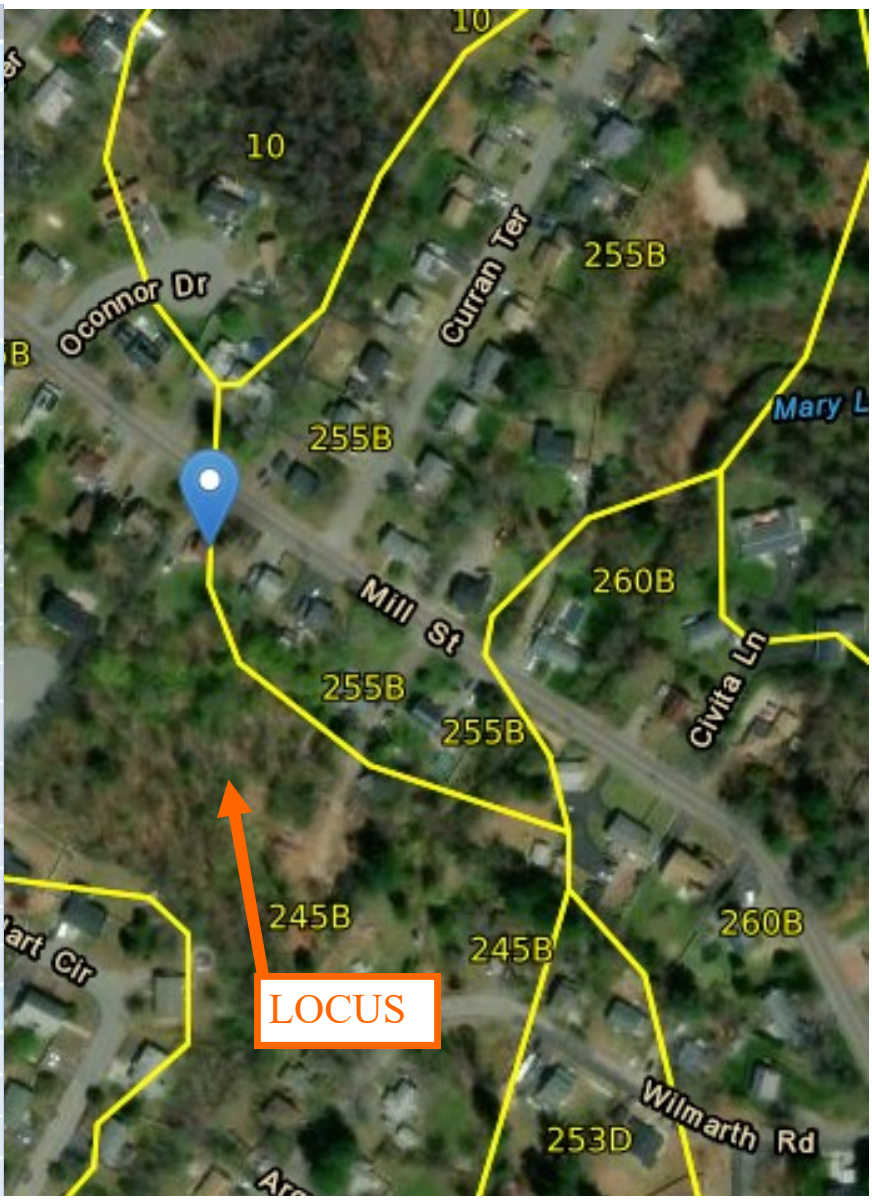
▲ Survey Metadata

Soil Survey Area: *MA616* ?

Scale: *1:25,000* ?

Published: *1985* ?

Last Export: *Sep 9 2022* ?



DATE:	TITLE:	SCALE:
April 10, 2023	***Soils Map***	***NOT TO SCALE***

PREPARED FOR:

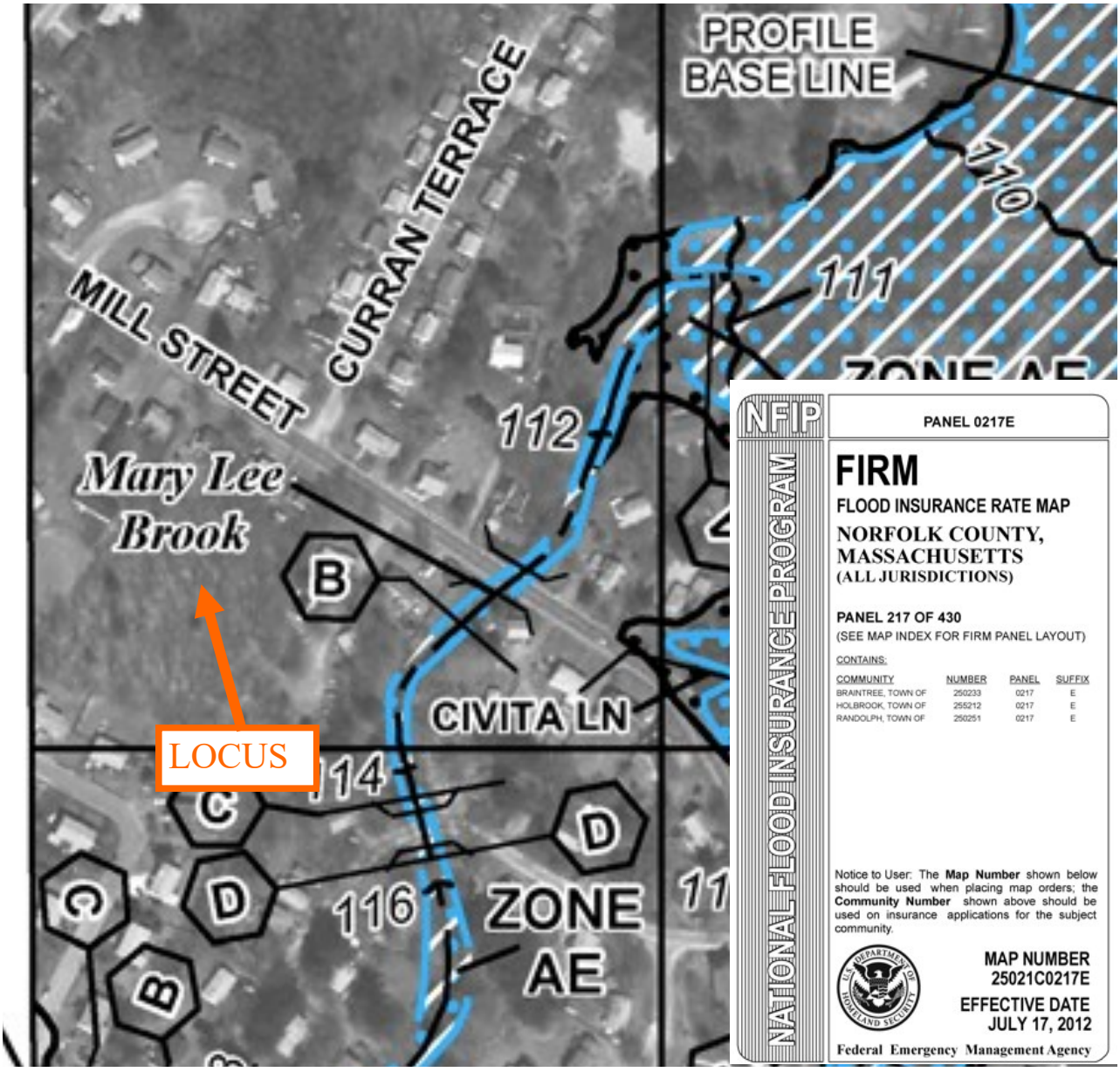
217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Definitive Subdivision
217 Mill Street
Randolph, Mass.



DATE:	TITLE:	SCALE:
April 10, 2023	***FEMA Flood Map***	NTS

PREPARED FOR:

217 Mill St, LLC
228 Park Avenue S, PMB 35567
New York, NY 89135

DeCelle-Burke-Sala & Associates, Inc.

1266 Furnace Brook Parkway, Suite 401 Quincy, MA 02169
(617) 405-5100 (O) (617) 405-5101 (F)

PROJECT TITLE:

Proposed Definitive Subdivision
217 Mill Street
Randolph, Mass.

Appendix E Watershed Delineation Plans

LEGEND:

EXISTING:

- LOCUS PROPERTY LINE
- TREE LINE
- SEWER MANHOLE (SMH)
- DRAIN MANHOLE (DMH)
- CATCH BASIN (CB)
- STONEWALL
- GAS VALVE
- WATER VALVE
- WATER SERVICE
- HYDRANT
- UTILITY POLE
- N/F – NOW OR FORMERLY
- D – DRAIN PIPE
- W – WATER MAIN
- G – GAS SERVICE
- UGE – UNDERGROUND POWER
- OHW – OVERHEAD WIRES
- S – SEWER MAIN
- LSA – LANDSCAPED AREA
- 25 – ELEVATION CONTOUR
- x25.7 – SPOT GRADE
- CHAIN LINK FENCE
- STOCKADE FENCE
- TEST PIT
- HAND HOLES FOR UTILITIES
- LIGHT POLE
- DECIDUOUS TREE
- CONIFEROUS TREE

DESCRIPTION	X-1	X-2	X-3	TOTAL
PAVEMENT	3,190 S.F.	0 S.F.	0 S.F.	3,190 S.F.
ROOF	919 S.F.	0 S.F.	0 S.F.	919 S.F.
LAWN	5,640 S.F.	1,467 S.F.	1,983 S.F.	9,090 S.F.
WOODS	2,579 S.F.	9,958 S.F.	51,776 S.F.	64,313 S.F.
TOTAL	12,328 S.F.	11,425 S.F.	53,759 S.F.	77,512 S.F.
Tc	10.2 MIN.	9.8 MIN.	9.8 MIN.	

DeCelle-Burke-Sala
& Associates, Inc.
1266 Furnace Brook Parkway #401
Quincy, MA 02169
617-405-5100 (o) 617-405-5101 (f)
www.decelle-burke-sala.com

COMMONWEALTH OF MASSACHUSETTS
JAMES W. BURKE
No. 40191
REGISTERED PROFESSIONAL ENGINEER

JAMES W. BURKE, P.E. DATE

GENERAL NOTES:

1. LOCUS:

ASSESSORS ID: 51-H-8.01
RECORD OWNER: ARSENAULT FAMILY TRUST
DEED REFERENCE: BOOK 14059 PAGE 498
PLAN REFERENCE: PLAN No. 204 of 1997

2. THIS PLAN IS THE RESULT OF AN ON THE GROUND SURVEY PERFORMED BY THIS OFFICE DURING JUNE 2022. ELEVATIONS SHOWN REFER TO NAVD-88.

3. EXISTING UTILITIES WHERE SHOWN IN THE DRAWINGS ARE FROM SURFACE OBSERVATION AND RECORD INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING THE PROPOSED CONSTRUCTION ACTIVITY WITH DIG-SAFE AND THE APPLICABLE UTILITY COMPANIES AND MAINTAINING THE EXISTING UTILITY SYSTEM IN SERVICE.

DIG-SAFE SHALL BE NOTIFIED PER THE STATE OF MASSACHUSETTS STATUTE CHAPTER 82, SECTION 409 AT TEL. 1-888-344-7233. THE ENGINEER DOES NOT GUARANTEE THEIR ACCURACY OR THAT ALL UTILITIES AND SUBSURFACE STRUCTURES ARE SHOWN. LOCATIONS AND ELEVATIONS OF UNDERGROUND UTILITIES WERE TAKEN FROM RECORD PLANS. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION, AND INVERTS OF UTILITIES AND STRUCTURES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION.

4. LOCUS IS LOCATED WITHIN A ZONE X, AS DELINEATED ON FIRM 25021C0217E, EFFECTIVE 07/17/2012.

5. PARCEL IS ZONED RSFHD.

PROJECT TITLE & LOCATION:

CLIFTON COURT DEVELOPMENT
DEFINITIVE SUBDIVISION
217 MILL STREET
RANDOLPH, MA

PLAN TITLE:

EXISTING WATERSHED DELINEATION PLAN

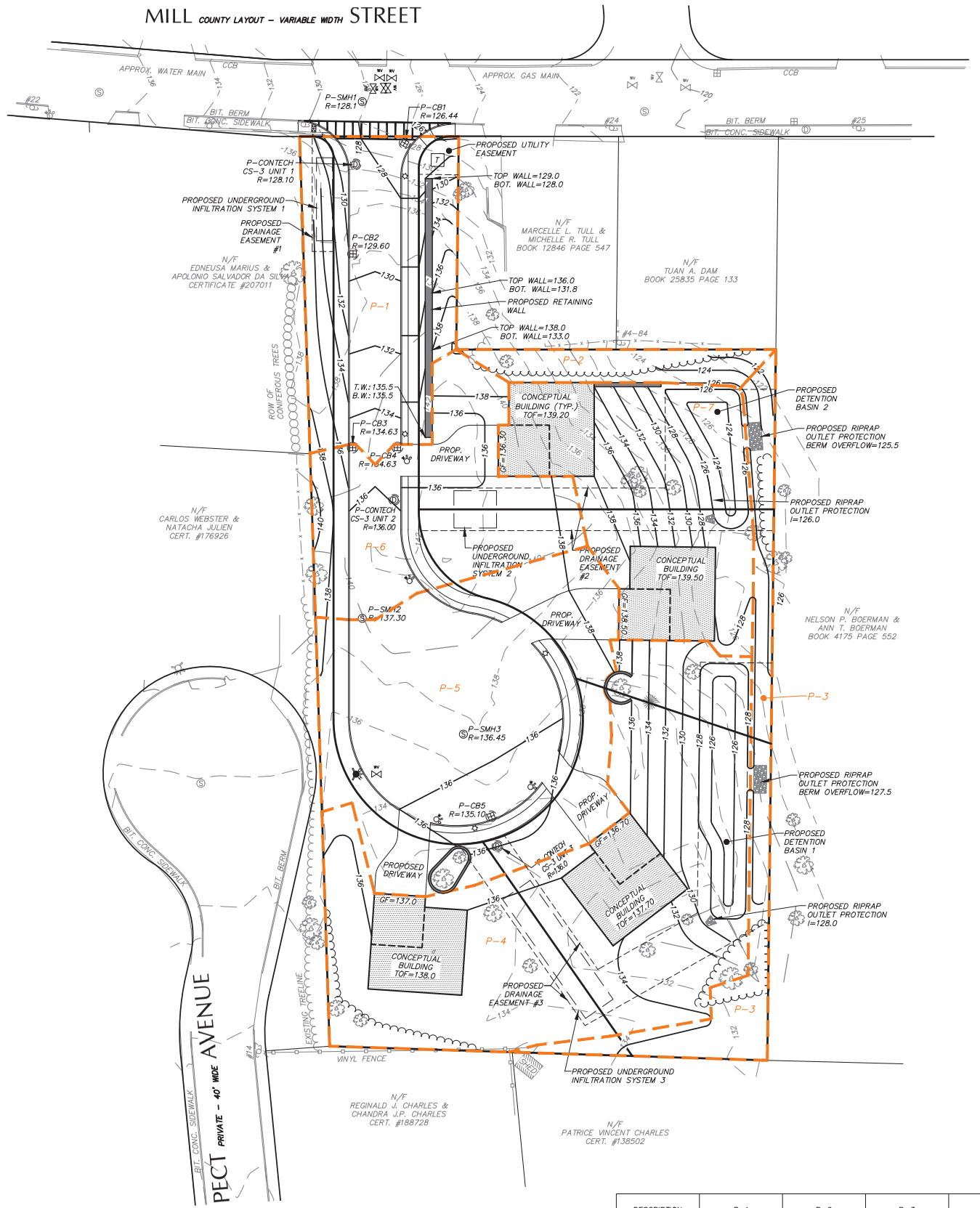
PREPARED FOR:

217 MILL ST, LLC
228 PARK AVENUE S, PMB 35567
NEW YORK, NY 89135

DATE: FEBRUARY 6, 2023
REVISED: APRIL 10, 2023
REVISED:
REVISED:
REVISED:

JOB NUMBER: 2022.030 | SHEET 1 OF 2

30 15 0 30 60
SCALE: 1" = 30'



LEGEND:

EXISTING:		EXISTING:
	– LOCUS PROPERTY LINE	
	– TREE LINE	
S	– SEWER MANHOLE (SMH)	S
D	– DRAIN MANHOLE (DMH)	D
	– CATCH BASIN (CB)	
	– STONEWALL	
GV	– GAS VALVE	GV
WV	– WATER VALVE	WV
	– WATER SERVICE	
	– HYDRANT	
	– UTILITY POLE	
N/F	– NOW OR FORMERLY	
D	– DRAIN PIPE	D
W	– WATER MAIN	W
G	– GAS SERVICE	G
UGE	– UNDERGROUND POWER	UGE
OHW	– OVERHEAD WIRES	OHW
S	– SEWER MAIN	S
LSA	– LANDSCAPED AREA	LSA
25	– ELEVATION CONTOUR	25
x25.7	– SPOT GRADE	x25.7
x x x x x	– CHAIN LINK FENCE	x x x x x
	– STOCKADE FENCE	
	– HAND HOLES FOR UTILITIES	
	– LIGHT POLE	
CCB	– CAPE COD BERM	CCB
VGC	– VERTICAL GRANITE CURB	VGC
SGC	– SLOPED GRANITE CURB	SGC
FF	– FIRST FLOOR	FF
BF	– BASEMENT FLOOR	BF
TOF	– TOP OF FOUNDATION	TOF
GF	– GARAGE FLOOR	GF
	– DECIDUOUS TREE	
	– CONIFEROUS TREE	

DESCRIPTION	P-1	P-2	P-3	P-4	P-5	P-6	P-7	TOTAL
PAVEMENT	4,541 S.F.	0 S.F.	0 S.F.	0 S.F.	11,917 S.F.	3,210 S.F.	0 S.F.	19,668 S.F.
ROOF	0 S.F.	0 S.F.	0 S.F.	3,760 S.F.	0 S.F.	0 S.F.	3,760 S.F.	7,520 S.F.
LAWN	5,457 S.F.	1,033 S.F.	4,429 S.F.	17,923 S.F.	6,277 S.F.	5,860 S.F.	6,908 S.F.	47,887 S.F.
WOODS	0 S.F.	1,031 S.F.	434 S.F.	972 S.F.	0 S.F.	0 S.F.	0 S.F.	2,437 S.F.
TOTAL	9,998 S.F.	2,064 S.F.	4,863 S.F.	22,655 S.F.	18,194 S.F.	9,070 S.F.	10,668 S.F.	77,512 S.F.
Tc	6 MIN.	6 MIN.	6 MIN.	6 MIN.	6 MIN.	6 MIN.	6 MIN.	

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